

FIRST ANNUAL REPORT
OF THE
BOTANICAL OFFICE
OF THE PROVINCE OF
BRITISH COLUMBIA

1913
BY
J. DAVIDSON, F.L.S., F.B.S.E.
PROVINCIAL BOTANIST



The Government of the Province of British Columbia.

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VICTORIA, B.C.:

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A few font style and size changes scattered throughout the document for readability. Figure 11, moved to the end of the document; to enable easier printing. And the table of Contents repaginated. No corrections to spelling have been made. Hyper linking , from the Contents and all the Figures,, has been done.

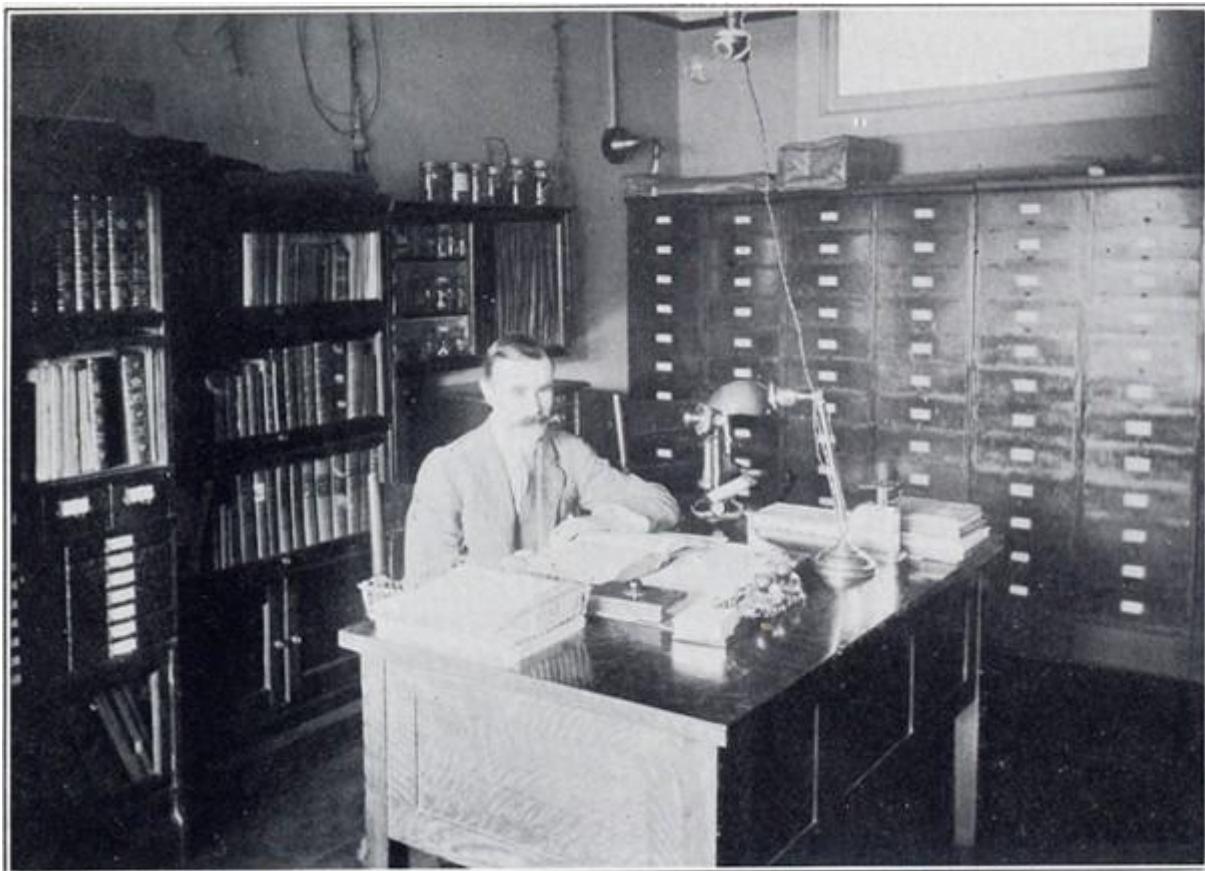


Fig. 1. Corner of Botanical Office. (J. Davidson at his desk.)

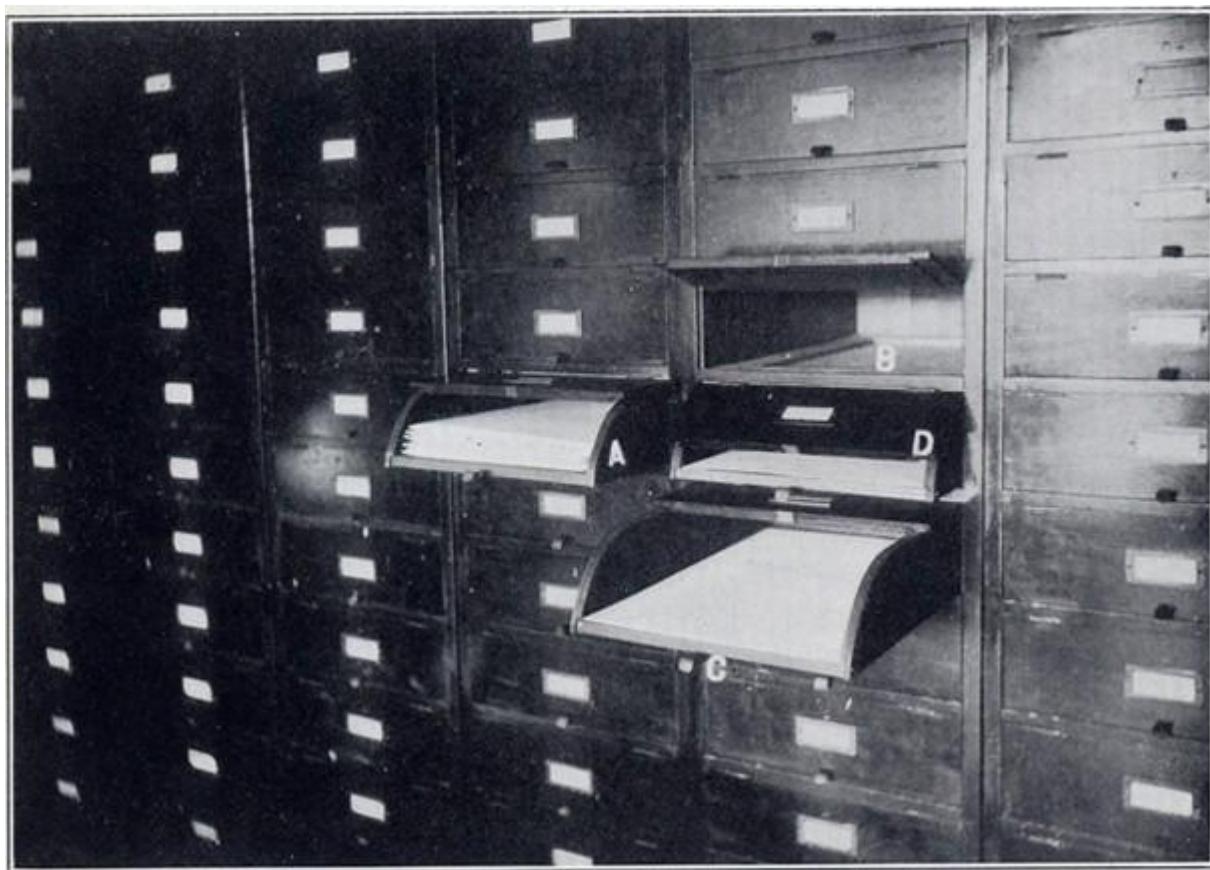


Fig. 2. Showing the structure of the British Columbia herbarium cases at present in use.

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To His Honour Thomas W. Paterson,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I respectfully beg to present herewith the First Annual Report of the Provincial Botanical Office.

HENRY ESSON YOUNG,

Provincial Secretary

*Provincial Secretary's Office
January, 1914*

FIRST ANNUAL REPORT OF BOTANICAL OFFICE.

VANCOUVER, B.C., January, 1914.

The Hon. Henry Esson Young, M.D., LL.D.,
Provincial Secretary, Victoria, B.C.

Sir,—I have the honour to submit herewith my First Annual Report of the British Columbia Botanical Office for the year ended 31st December, 1913.

(1.) A Provincial Herbarium of the Native Flora.

At the time of the establishment of this office in 1911 there was no official department in British Columbia which could supply information regarding the native flora. A representative herbarium of the flora of the Province was not to be found nearer than Washington, D.C., while the best collection of British Columbia plants was to be found at Ottawa.

A splendid collection had been brought together for the Agricultural Department, Parliament Buildings, Victoria, by Mr. James R. Anderson, who was for a number of years Deputy Minister of Agriculture, and who vacated office a few years previous to the establishment of the Botanical Office. This collection would have formed a very good nucleus for a Provincial Herbarium; the specimens were well preserved and neatly mounted and, with a few exceptions, correctly named. It was observed, however, that the families and plant groups were arranged alphabetically instead of by any of the well-known systems of classification. One found such groups as Algae, Araceae, and Araliaceae, or Labiateae, Leguminosae, and Lichens associated together.

There was no university course in botany given in the Province, there being only the elementary one prescribed for high-school students, and, in anticipation of a Botanical Department for the University of British Columbia, it was considered advisable that some preliminary botanical work should be done in order to facilitate botanical instruction when the Department was organized. It was therefore decided that part of the work of this office should be the formation of a representative Provincial Herbarium which would supply specimens of the various groups of native plants for a university collection. At the same time, specimens suitable for the Botanical Museum were to be collected and prepared for future use.

During the year (1911) attention was devoted to the formation of a local collection, and specimens were brought in from all parts of the city and its suburbs. Since then, owing to the rapid development of the city, to the clearing and draining of outlying property, several of the plants collected during the first year have become almost, if not quite, extinct within the city boundary. Notes and observations made during that year will be of considerable interest later on, when compared with the future flora.

During the second year (1912) collections were made from the following districts adjacent to Vancouver : Point Grey, Lynn Valley, Coquitlam and Surrey Districts, Caulfields, Lulu Island, Moodyville, Black Mountain, Grouse Mountain, Garibaldi Mountain region (previously unexplored), and also from Savary Island and Victoria.

In addition to local collections, specimens were received from various parts of the Province as the result of the organization of a number of volunteer correspondents. In this way specimens were sent from Victoria, Shawnigan Lake, Mayne Island, Ucluelet, Nanaimo, Anvil Island, Pender Harbour, Graham Island, White Mountain, Mount Brunswick, Chilliwack, and Elgin Districts, Choelquoit Lake, Spences Bridge, Ashcroft, Fort George, Peace River District, Thompson River District, Kelowna, Trail, B.C.

Last year (1913) collections were made in the district between Colebrook and White Rock, and from the suburbs of Victoria, including the Goldstream District.

From July 14th to 23rd a visit was made to various points in the Dry Belt, including the districts around Spences Bridge, Kamloops, Sicamous, Armstrong, Vernon, and Penticton, resulting in the collection of a large amount of material for the Herbarium and Botanical Garden. Numerous photographs were taken, illustrating the conditions of plant-life and the characteristic vegetation of the country traversed.

From July 26th to August 10th a visit was made to the Garibaldi Mountain region, where further collections of plants for the Herbarium and Botanical Garden were made, and a number of photographs were taken to illustrate the alpine flora. During this year correspondents sent in collections from Savary Island, Ucluelet, Alberni, Duncan, Shushartie Bay, Victoria, Gibson Heights, Gambier Island, Mission City, Spences Bridge, Armstrong, Vernon, Summer-land, Rossland, Golden, Rocky Mountains, Babine Lake, Stuart Lake District, and the north-east part of the Province (previously unexplored).

In this way sixty-four collections were received from correspondents, compared with fifty-one received the previous year.

It is expected that the Provincial Herbarium will ultimately be arranged in steel herbarium cases; meantime, owing to the necessity of procuring these from the East, and the length of time which must elapse before they were delivered in Vancouver, it was found necessary to have a temporary set made to accommodate the thousands of herbarium specimens which had accumulated.

A new and improved form of herbarium case was devised, and can be recommended for its simplicity, economy, convenience, and, above all, for its being as nearly as possible dust-proof.

The drawings and specifications were prepared by the Provincial Botanist and supplied to a local firm, who made the cases from well-seasoned fir. The cases are made in tiers of twelve compartments, each of which measures 19 x 13 x 4½ inches. In each compartment is a drawer—[Fig. 2](#) (A)—containing the genus covers and their contents.

It will be observed in the photograph (B) that each compartment is self-contained, so that when a drawer is pulled out it causes no suction on the other compartments. A small brass handle (C) projects beyond the front edge of the drawer, and as the drawer is pushed in, the lid above it drops down (D) behind the handle, and is tightly closed when the drawer is shut. It will be seen, therefore, that to consult the specimens in any compartment, all that is necessary is to pull the small brass handle, when the drop-lid will automatically open upwards, and the specimens can be consulted in an instant. This type of herbarium can be strongly recommended for storing school collections. They occupy little space and can be added to from time to time as the collection increases.

This system has been adopted by one or two private collectors on account of their efficiency and economy.

(2.) The collection of information and literature relating to the flora.

In commencing the identification of British Columbia native plants, it was found that there was no "Flora" which dealt adequately with the native species,-and it was necessary to procure the "Floras" of the adjacent States and of Eastern Canada. The most useful work in this connection giving information on the flora of British Columbia is the Catalogue of Canadian Plants prepared by Prof. John Macoun, Naturalist to the Geological and Natural History Survey of Canada, but being a catalogue, it simply indicates those plants which Professor Macoun has found, or has received records of, from all parts of Canada, including British Columbia.

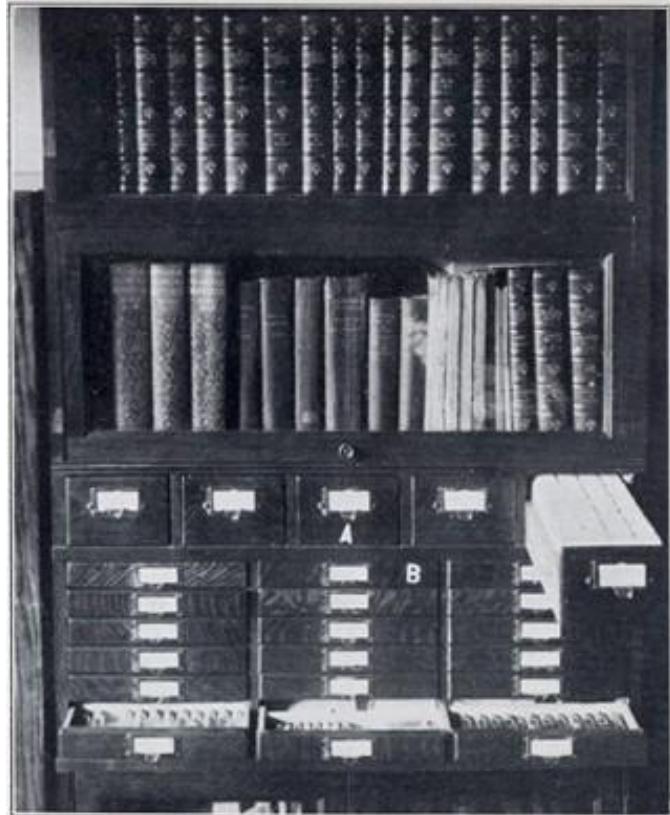


Fig. 3. Showing drawers containing (A) card index, and (B) reference collection of seeds of native flora.



Fig. 5. Showing the case containing the volumes of record sheets and distribution maps.

Literature on the Algae is very meagre. Harvey's "Nereis Boreali Americana," Setchell and Gardner's "Algae of North-West America," Miss Tilden's "Minnesota Algae," and F. Shipley Collins' "Green Algae of North America" contain occasional references to species found in British Columbia.

With regard to fungi, there is a great field for work here. The native parasitic and saprophytic fungi are met with on every hand. There is practically no information concerning the fungus flora of the Province, although many are described in some American books dealing with mushrooms and plant-diseases.

Amongst the most useful books available for the Bryophyta are Tuckerman's "Lichens," Schneider's "Lichens," Dr. Grout's "Handbook to the Study of Mosses," and Lesquereux & James' "Mosses of North America," but these are more suited for Eastern workers than for those west of the Rocky Mountains.

For the Pteridophyta and Spermaphyta it is necessary to have a number of "Floras," including those of the East as well as those of Western States, in addition to securing the publications of botanical institutions for the descriptions of new species. Howell's "Flora of Oregon," Piper's "Flora of Washington," Coulter & Gray's and Coulter & Nelson's "Flora of the Rocky Mountain Region," Gray's "Flora of North America," Hooker's "Flora Boreali Americana," etc., are more or less necessary to cover the majority of British Columbia species.

It may safely be said that at the present time the botany of the North-west is in a rather chaotic state, owing to the uncertainty of many species, due in a large measure to the amount of variation corresponding with many different environments. There is little doubt that, on closer study of the specimens in the field, ecological botanists will be able to place many so-called species in their true position as mere variations of well-defined species. This is especially true in regard to species which have been segregated on very artificial characters based chiefly on the examination of herbarium specimens.

It is a frequent occurrence to find two floras at variance with each other on the same species, and equally common to find two or even three descriptions of the same plant under different names. It is one of the aims of the Botanical Office to procure copies of all works containing the original descriptions of native species, so that a beginning may be made in reducing the existing chaos to some order.

(3.) Records of native species.

Provision has been made for keeping the records of all specimens found, or reported as found, in British Columbia. Many of these records appear in catalogues, floras, and in the publications of scientific societies. This necessitates the perusal of past and current literature relating to British Columbia plants.

A card-index of the native plants is in course of preparation ([Fig. 3](#)), and each card indicates where the plant is described and illustrated, and whether it is represented by herbarium or fluid specimens.

BOTANICAL SURVEY OF BRITISH COLUMBIA.

area or river-basin.	locality.	date.	reference or authority.	remarks.

Fig. 4. Heading of record sheet.

A record sheet is provided for each species or variety, and each sheet indicates: (a) Area or river-basin in which the plant was found; (b) locality in detail, giving, if necessary, the latitude and longitude; (c) date; (d) collector, or authority of the record; (e) general remarks. The records are kept in a loose-leaf system, so that additional sheets may be interposed where necessary. They are bound in spring-back binders which hold from 150 to 200 sheets of the same size as the herbarium sheets. They are classified according to Engler's system, and each volume has a thumb-index to facilitate the consultation of the records of any particular genus.

In the illustration ([Fig. 6](#)) will be seen a volume (a) placed so as to show the thumb-index. Another volume has been opened for recording purposes. The empty binder (b) may be seen, and (c) the record sheets in position for adding records.

(4.) To ascertain the distribution of species in the Province.

Coincident with the collection of records, provision is made for ascertaining the distribution of all species throughout the Province. Maps have been prepared dividing the Province into natural areas according to the watersheds. In this way nineteen river-basins have been marked off, and it is intended to ascertain the distribution of each plant in each river-basin, with a view to ascertaining the southern or northern limits of species. The Columbia river-basin has been subdivided into three, according to the rivers which drain each particular area in British Columbia. The Okanagan and Kootenay Rivers join the Columbia after they cross the Boundary.

For botanical survey-work the Province has thus been divided up into a number of natural areas, instead of selecting municipal, political, or other artificial boundaries. An effort was made to subdivide the Fraser river-basin, but owing to the variation of climatic and other conditions found within that area, it was considered impracticable without introducing some artificial method.

It will be of interest, in connection with this work, to observe the distribution of northern plants in the southern parts of the Province; many of these are found in the alpine regions and will naturally be confined to localities near the watersheds.

Provision has been made, besides giving the localities in which they are found, to indicate their frequency in each locality. The accompanying illustration will show how this is done. ([Fig. 7](#))

(5.) Co-operation of volunteer correspondents.

From an early stage in the work of this Department, efforts have been made to get into touch with all who are interested in botanical or nature-study work. These efforts have been amply rewarded, as they have revealed the fact that there are many individuals throughout the Province who are, or have been, interested in the flora.

It has been the aim of this office to encourage such individuals by rendering them such assistance as they may require in the identification or preparation of their specimens. Through this means many enthusiastic correspondents have been secured, who are gladly co-operating by supplying specimens for the herbarium and for the survey records. These correspondents include teachers, surveyors, members of field clubs, natural history societies, and individuals who are to a large extent isolated and who have taken up the study of the flora as a hobby in their spare time.

Owing to the fact that there is no book of much value available for assisting amateurs to become acquainted with the names of the native plants, the facilities offered by the Botanical Office for the identification of specimens have been well taken advantage of. The plan adopted is that persons desiring to have specimens identified collect duplicates of each plant and send one set to the Botanical Office, while the other is retained by the collector. Each specimen

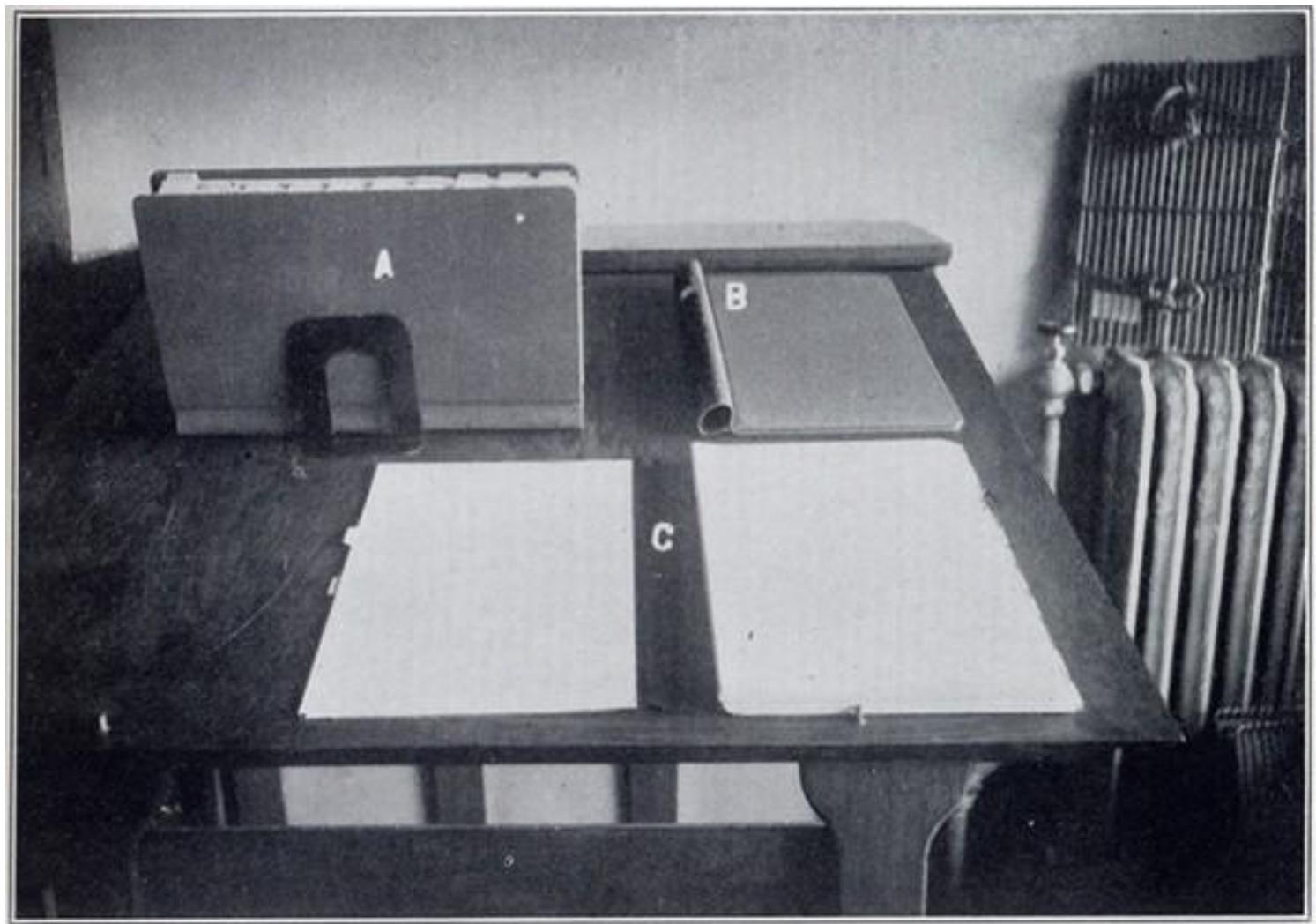
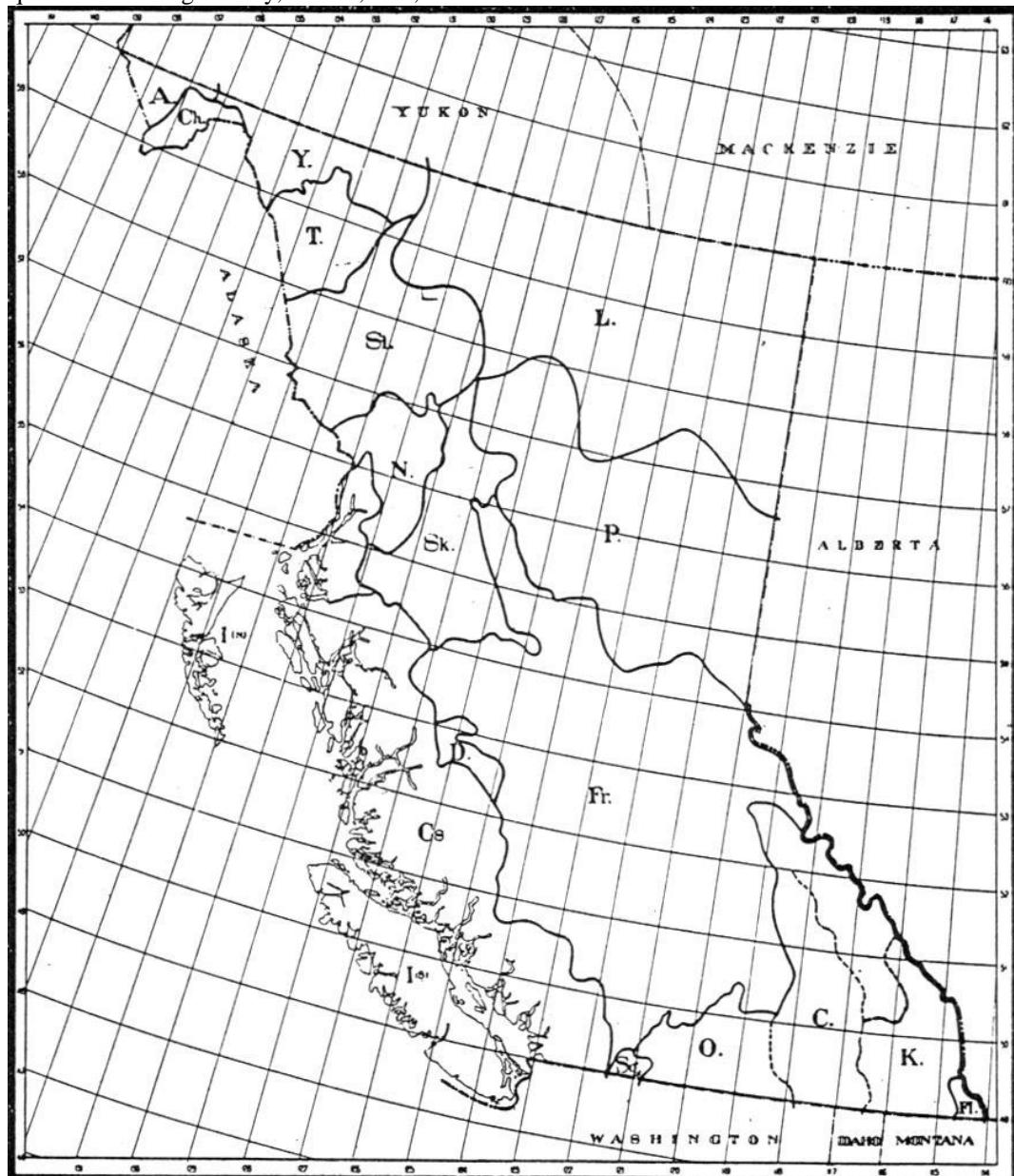


Fig. 6. Showing two volumes of record sheets. (Wire plant-pressers on the radiator.)

sent to the Botanical Office bears a number corresponding to the number on the specimen retained by the collector. Along with the number is given such details as are required concerning locality, habitat, date, etc.



Areas or River-basins

- A. Alsek river-basin
- Ch. Chilkat
- Y. Yukon
- T. Taku
- L. Liard
- St. Stikine
- N. Nass
- Sk. Skeena
- P. Peace
- D. Dean
- Fr. Fraser
- Sg. Skagit
- C. Columbia
- O Okanagan subdivision of Columbia
- K Kootenay
- Fl. Flat-head river-basin
- Cs. Cascade strip, or Coast area
- I(n) Island area North of 51°
- I(s) Island area South of 51°

Interpretation of signs used.

- Recorded with no indication of its frequency
- ⊖ One specimen, recorded from this locality
- Rare; a few, not limited to a particular locality
- ⊖ Rare, and local, = a few within a circumscribed area
- + Frequent, common throughout that locality
- Frequent but local, = limited to a certain area.
- * Profuse throughout that locality = spreading in all directions.

Heavy lines = Watersheds

Fine lines = Coast-line

- - - - - = Boundaries

==== Where boundary follows the watershed

Fig. 7. Facsimile of distribution map.

If the correspondent is situated within a short distance of the Botanical Office, he or she may forward the specimens fresh, otherwise the correspondent prepares duplicate herbarium specimens and sends them in for identification towards the close of the collecting season. The duplicates sent to the Botanical Office are retained for future use, but a list bearing the numbers and the names of the specimens is forwarded to the correspondent, so that by comparing the numbers of the specimens in his collection with the numbers on the list he obtains the name of the specimens. Several correspondents have commenced private collections as a result of the assistance of this office. A large number of specimens have been received from the following enthusiastic correspondents:—

W. H. Brittain, Esq., Vernon, B.C.

H. C. A. Cornish, Esq., B.C.L.S., Rossland, B.C.

George Fraser, Esq., F.R.H.S., Ucluelet, B.C.

E. B. Hart, Esq., B.C.L.S., north-east of the Province.

Prof. J. K. Henry, Vancouver, B.C.

Dr. C. T. Hilton, M.B., B.S., Port Alberni, B.C.

Miss A. S. MacKenzie, Mission City, B.C.

Dr. C. F. Newcombe, Victoria, B.C.

C. C. Pemberton, Esq., Victoria, B.C.

Fred Perry, Esq., Vancouver, B.C.

Mrs. S. Stoker, Duncan, B.C.

William Taylor, Esq., Vancouver, B.C.

J. A. Teit, Esq., Ethnologist, Spences Bridge, B.C.

E. Wilkinson, Esq., B.C.L.S., Victoria, B.C.

Eli Wilson, Esq., B.A., Armstrong, B.C.

Some of the above deserve special mention for the assistance rendered to this office. Mr. H. C. A. Cornish has supplied very good collections illustrating the flora of Rossland and district. Many interesting specimens, including a few new records for British Columbia, have been received through his co-operation.

Mr. G. Fraser, who has for many years taken a keen interest in the native flora, has on several occasions sent collections of rare native species for the Botanical Garden, in addition to frequent collections of plants from the west coast of Vancouver Island for the Herbarium. Mr. E. B. Hart, through the Surveyor-General, G. H. Dawson, Esq., sent in an interesting collection of specimens illustrating the flora of the north-east portion of British Columbia, which has hitherto been unexplored. He is spending the winter in this region so as to be able to commence work early in spring, and it is expected that as a result of his work during the coming season a fairly good knowledge of the flora of this outlying portion of the Province will be obtained.

Prof. J. EL. Henry, an observant field botanist who has been interested in the native flora for about twenty years, has given much valuable information concerning the flora of particular localities. Many herbarium specimens have also been contributed by him.

Dr. C. F. Newcombe has for many years been keenly interested in the native flora, and the Botanical Office is indebted to him for information regarding the early literature referring to the flora. Many valuable specimens have also been received as a result of his peregrinations on the west coast.

Mr. J. A. Teit, who is well known for his work amongst the Indians in the Interior, has had many opportunities of collecting specimens from the Dry Belt during his travels, and the Botanical Office has benefited by his contributions of specimens for the Herbarium, as well as of plants for the Botanical Garden.

Mr. E. S. Wilkinson has contributed specimens from the northern portions of British Columbia collected under great difficulties owing to the mountainous nature of the country. Several of his specimens from the north are of particular interest.

Mr. Eli Wilson, an enthusiastic field botanist, who has for thirteen years been interested in the native flora, has from time to time contributed collections of specimens for the Herbarium and seeds for the Botanical Garden. In December, 1913, he presented his whole collection of over 1,000 herbarium specimens to this office. The collection is very representative of the Interior, and contains many interesting and rare plants.

The following have from time to time contributed specimens, but have not yet become regular correspondents of the office :—

F. Gray Aldous, Esq., B.C.L.S., Shushartie Bay, B.C.
 Professor Bessey, Michigan, U.S.A.
 L. N. Bower, Esq., Peace River District, B.C.
 R. P. Bishop, Esq., B.C.L.S., Victoria, B.C.
 G. V. Copley, Esq., B.C.L.S., Victoria, B.C.
 J. G. Darling, Esq., B.Sc., Vancouver Island.
 N. Gething, Esq., Peace River District, B.C.
 Balfour Gourlay, Esq., Edinburgh, Scotland.
 C. de B. Green, Esq., Graham Island, B.C.
 F. Groves, Esq., Kelowna, B.C.
 Mrs. J. Henshaw, Vancouver, B.C.
 A. J. Hill, Esq., C.E., New Westminster, B.C.
 F. James, Esq., James Island, B.C.
 R. J. Matthews, Esq., Gibson Heights, B.C
 F. L. McKeever, Esq., F.R.M.S., Penticton, B.C.
 G. K. McLean, Esq., Vancouver, B.C.
 Hugh Samson, Esq., Vancouver, B.C.
 Thomas Selwood, Esq., Vancouver, B.C.
 Herbert G. Selwood, Esq., Vancouver, B.C.
 Principal R. S. Sherman, Vancouver, B.C.
 J. A. Smith, Esq., Duncan, B.C.
 T. H. Taylor, Esq., B.C.L.S., Vancouver, B.C.
 P. de Noe Walker, Esq., Victoria, B.C.
 J. A. Walker, Esq., B.C.L.S., Vancouver, B.C.
 E. A. Wallace, Esq., Victoria, B.C.

The following have intimated their willingness to co-operate in supplying specimens of the flora of the district in which they are situated during 1914:—

H. M. Fraser, Esq., Surveyor, Vancouver, B.C.
 David Gellatly, Esq., Gellatly, B.C.
 Gustave Gervais, Esq., South Hazelton, B.C.
 R. Landell, Esq., B.A., Golden, B.C.
 John Marr, Esq., M.A., Chilliwack, B.C.
 W. G. Paxton, Esq., Atlin, B.C.
 Robert Pelton, Esq., Atlin, B.C.
 John Stephen, Esq., M.A., Sointula, Malcolm Island, B.C.
 Charles Webster, Esq., Armstrong, B.C.
 H. H. Whittaker, Esq., Kaleden, B.C.
 James A. Wattie, Esq., M.A., Kamloops, B.C.

(6.) Information on the Flora.

Many inquirers visit the Botanical Office in order to ascertain the names of the plants which they have found, or to ascertain the distribution of particular plants of economic importance.

Visitors from Great Britain, Eastern Canada, and the States, while travelling in the West, occasionally call to make inquiries regarding the flora. Inquiries by post are also received from various parts of the world.

(7.) Exchange of herbarium and garden specimens or seeds of native plants.

On account of the large number of specimens received during each year from correspondents in different parts of the Province, there are a number of duplicates which can be utilized for purposes of exchange and for helping other scientific institutions.

In the event of a representative herbarium being desired in Victoria for the convenience of workers in Vancouver Island, many of the above duplicates can be spared for this purpose. It is intended that many of the existing gaps in the present Victoria collection will be filled from this source.

Requests are occasionally received from scientific institutions desiring specimens of British Columbia plants, particularly from newly explored regions. It is intended as far as possible to send duplicates in response to these requests. Similarly, with regard to live plants or seeds for botanical garden purposes, native species are being propagated in the Botanical Garden at Essondale, and some of these may be used to encourage the establishment of other botanical gardens in the Province, or to supplement the collections in other botanical gardens out of the Province.

Fruits and seeds are collected each year, and it is hoped that this Department will soon be in a position to reciprocate with other botanical institutions by issuing a list of seeds for exchange.

(8.) The dissemination of knowledge of the flora by means of articles, papers, lectures, etc.

It is found that there are many people desirous of becoming familiar with the flora, but they are not acquainted with the fact that there is a Department to render assistance in this direction.

Knowledge of the flora has been disseminated by means of articles which have appeared in magazines, and by means of occasional public lectures. The following articles relating to the flora have been published:—

- (1.) "The Botanical Aspect of British Columbia" (illustrated), in "British Columbia: Its History, People, Commerce, and Resources." (Sells, London.)
- (2.) "Botanical Work for Mountaineers," in the Northern Cordilleran. (British Columbia Mountaineering Club, Vancouver.)
- (3.) "Our Native Flora" (illustrated), in the Fruit and Farm Magazine, January, 1914.

Amongst the lectures delivered were the following:—

- (1.) "Botanical Opportunities in British Columbia," to the British Columbia Academy of Science (to appear in their Proceedings).
- (2.) "Mountaineering as an Educational Stimulus—" (illustrated), to the British Columbia Mountaineering Club.

- (3.) "Entomology from the Standpoint of a Botanist," to the British Columbia Entomological Society. (Printed in the Proceedings of the Society and also in the Fruit and Farm Magazine, September, 1913.)
(4.) "Some British Columbia Native Plants for the Garden" (illustrated by slides and specimens), to the Vancouver Horticultural Society.
(5.) "What we mean by Our Native Flora" (illustrated by slides and specimens), to the Vancouver Chamber of Mines.

During the fall of 1911 a deputation from the British Columbia Mountaineering Club asked for advice regarding the formation of a class for the instruction of its members in systematic botany; as a result, a botanical section of the club was organized and a course of study prescribed for the first winter. After the opening lecture the classes met weekly, and a lecture was given each month throughout the winter. During the winter 1912-13 lectures were given every alternate Tuesday, and the class met on the intervening Tuesdays to follow out a prescribed course of study. During the winter 1913-14 a more thorough course, consisting of about fifty lectures (twenty-five elementary and twenty-five advanced), was given to a class with an average attendance of between twenty and thirty. Amongst the students attending this class were a number of teachers from Vancouver, New Westminster, and inter-urban districts, as well as the regular members of the botanical section of the British Columbia Mountaineering Club.

During the summer, opportunities were afforded for the students becoming acquainted with the flora by occasional excursions to districts in the vicinity of Vancouver.

(9.) Botanical assistance to those engaged in nature-study work (school gardens and school herbaria).

It is expected that the Botanical Office will become a centre for the supply of information to teachers regarding the native flora and its relation to nature-study in schools. A number of teachers are already on the list of correspondents, and as the work of the Botanical Office is better known it is hoped that a larger number of teachers will act as correspondents for the locality in which their school is situated.

Information has been given regarding the formation of school herbaria. These are considered almost necessary in a Province such as this, where the climatic conditions vary so much according to the locality.

It would be of great educational value if each school throughout the Province had a properly prepared set of herbarium specimens to illustrate the flora of the district around the school. It will be found that the collection belonging to a school in one locality in the Dry Belt differs in some respects from that in another locality; and that the flora of the Dry Belt differs markedly from that of the Coast; that the flora in different localities on the Coast will differ from other localities on the Island, and so on.

School herbaria will be valuable in enabling teachers to become acquainted with the plants of that locality and enable them to give the children the benefit of this knowledge; thus botanical information will be disseminated to all parts of the Province.

School herbaria will be found of particular value to teachers who have been transferred from one locality to another. For example, a teacher who has been employed for a few years in the Dry Belt and has become acquainted with the characteristic flora of such regions, when transferred to a school in some other part of the Province, is faced with new difficulties on finding that the vegetation as a whole is different.

The school herbarium would also be of service to new-comers, such as teachers from the East possessing a good knowledge of the Eastern flora; they are greatly handicapped on account of the difficulty in obtaining the names of the native plants, which are, on the whole, very different from those east of the Rocky Mountains.

Advice and instructions are given to teachers regarding the formation of such school collections. In order to facilitate this work throughout the Province, the Botanical Office has arranged with one or two firms to manufacture or supply the requisites for botanical work, thus saving the inconvenience and loss of time in having to send East or to the States for them. Lenses, forceps, needles, wire frames for pressing plants, pressing and mounting paper, and botanical collecting cases may now be had in Vancouver.

In regard to the formation of school gardens, there are great opportunities for doing much useful work both in town and country. There are so many showy native plants, and so many particularly useful types for nature-study, that each school should as far as possible have its own school garden to illustrate the different types of plants found in the Province, and to grow a sufficient quantity of selected specimens to supply useful material for the nature-study classes. The Botanical Office serves as a centre for the exchange of specimens between schools in different parts of the Province.

A teacher desiring to have a collection of special plants in the garden may, on communication with the Botanical Office, obtain supplies of seeds or plants, or, failing that, may be brought into touch with a correspondent who may be able to supply the particular species. In this way a school at the Coast or on the Islands may obtain specimens of Dry Belt or alpine plants, and, similarly, schools in the Dry Belt may obtain characteristic plants from the Coast.

Most of the work in connection with the school garden can be done by the children under the supervision of the teacher, and, as a rule, an interesting display of plants from adjacent districts may be brought in by the children. The school janitor could attend to the specimens during the school vacation, particularly such specimens as require to be occasionally watered.

With the object of aiding in the dissemination of a knowledge of the British Columbia native flora, the suggestion was made by the Botanical Office to the Board of Parks Commissioners that a public botanical garden should be established in Stanley Park, Vancouver. It was suggested that accommodation should be provided for a representative collection of the Province, including the Southern, Coast, and Dry Belt floras, and that as far as possible all the native trees and shrubs be represented.

To add to its educational value, it was proposed that a few beds should be specially devoted to selected British Columbia types for nature-study lessons, so that teachers may find some suggestions which would be applicable in their school-work.

The suggestion was at once accepted, and soon afterwards a portion of Stanley Park was set aside for this purpose. A plan has been prepared of the proposed garden, and it is expected that a commencement will be made during 1914 in laying out the flower-beds and rock garden.

(10.) Local lists of the flora, by field clubs, natural history and other societies.

It is anticipated that by the additional facilities given for the teaching of nature-study the next generation of young men and women will be more interested in this kind of work than the preceding one, and that field clubs and natural history societies will be more common throughout the Province. It is the desire of the Botanical Office to obtain the co-operation of such clubs and societies by encouraging the members to undertake some original work on



Fig. 8. Botanical garden during the first winter.

the flora of their own neighbourhood. A beginning has already been made by the British Columbia Mountaineering Club, whose headquarters are in Vancouver. This club has undertaken to make systematic records of the flora of the mountains north of Vancouver. The members of the botanical section attended classes in botany for the purpose of enabling them to make useful observations in the field. A suggested plan of work was published in the first issue of the Northern Cordilleran and was later enthusiastically adopted.

(11.) Collection of specimens for the establishment of botanical gardens.

At the request of the Botanical Office the Government reserved a piece of ground at the Colony Farm, Essondale, to be used as botanical nursery for the propagation of specimens of the native flora. Work on this nursery was commenced in the spring of 1913. A gardener was appointed to take charge of the sowing and other garden operations.

Owing to the season being too far advanced for the preparation of flower-beds in lawn, a commencement was made in planting the various species by themselves, allowing about one square yard for each. One portion of ground was sown out in lawn in which beds were cut during the fall of 1913. In the spring of 1914 a commencement will be made in arranging the specimens according to their families. ([Fig.8](#))

During the season of 1913 about 600 species were established, constituting a unique collection of plants from the Coast, Dry Belt, and alpine regions of British Columbia.

During the winter of 1913 the preparation of permanent plant labels was commenced. These are prepared on thick sheet lead; the name is stamped by means of steel dies and the impression is afterwards filled up with a white metallic paint. These labels are mounted on strong wire supports which are pushed into the ground. Their advantages are, that they are inconspicuous at a distance, the name is always legible, and they are unaffected by frost during the winter.

It is intended to establish a Native Arboretum in connection with the Botanical Garden. There are approximately sixty different species of native trees, of which about one-half have already been secured, and it is expected that others will be obtained during the spring of 1914.

Many native trees and shrubs, as well as herbaceous plants, are exceedingly attractive, and are worthy of the attention of horticulturists. The native dogwood (*Cornus Nuttallii*) is invaluable for landscape-gardening; the large flowers freely produced in the spring, and the graceful habit of the tree, make it exceedingly useful in decorating grounds, while its vivid autumnal tints, varying from green to red and yellow, are surpassed only by the vine-maple (*Acer circinata*), which is so abundant near the Coast. ([Fig.9](#))

The native madrona (*Arbutus Menziesii*) is an ornamental tree worthy of more attention. In landscape-work it is well known as a hardy tree, its beautiful brown velvety bark, its large ever-green leaves, and the large racemes of white flowers succeeded by red fruits make the plant extremely useful and attractive.

Some of the most desirable species of herbs, shrubs, and trees are being propagated so as to secure supplies for future use in connection with the University, or for exchange with other botanical gardens.

(12.) Ecological conditions of the British Columbia flora.

Seeing that botanical work in British Columbia has not been definitely and systematically studied, and that the only available information has been obtained by collectors on occasional visits to the Province, or by collectors who are more or less settled in one locality, it is intended, besides ascertaining the distribution of each species throughout the Province, to make observations on the relation of those species to their environment.

In a Province like British Columbia, where the change of environment is often sudden, it is expected that many interesting subjects for observation will be brought to light. It is common to find, within one or two miles of the sea, mountains rising to an altitude of from 5,000 to 9,000 feet, with an entirely different belt of vegetation separating the characteristic shore plants from the characteristic mountain plants, but occasionally the zones overlap, resulting in a considerable amount of variation in different species. The transition from the Coast area to the Dry Belt is very abrupt. This is particularly well seen on passing east of the Coast Range between Keefer, on the Lower Fraser River Canyon, and Lytton. At Keefer the flora is characteristically that of the Coast area; at Lytton the flora is characteristic of the Dry Belt. Between those two places may be seen a gradual overlapping; the Coast flora becoming more reduced towards the east, and the Dry Belt flora becoming reduced towards the west, being crushed out by the growth of those plants better adapted for life in a more moist region.

It would be premature at the present time to give the results of the observations made in those areas, there being so many other areas from which information should be obtained.

One result of these ecological observations is the acquirement of knowledge relating to the value of land for agricultural or afforestation purposes. This information will be of most value in connection with the exploration of unknown portions of the Province, as from the flora it can be ascertained what conditions exist in each particular area; the "plant associations" represented in each area, giving information concerning the soil, exposure, and the length of the growing season, etc.

For the purpose of ascertaining the characteristic flora of particular environments, intensive collections have been made of selected habitats, and when the collections are compared, it is found that there are many different plant associations. By this means, also, one is enabled to separate out those plants which are not characteristic of each habitat, and at the same time discern variations attributable to environment.

(13.) Botanical exploration of the Province.

Hitherto, botanical exploration of the Province has been chiefly confined to the Railway Belt and to the vicinity of various centres which can be reached either by highways or by boat service on the lakes. Occasionally collections have been made in the vicinity of the large rivers, such as the Fraser and Peace Rivers, by explorers or members of survey parties, etc. The records of such collections, together with the work of present correspondents, are taken into account in ascertaining those districts in need of botanical exploration.

As a result, it is found that there are vast areas in the Province from which no knowledge of the flora has been obtained; some parts of the Province still remain to be explored, and have not yet been visited by white men; indeed, there are some localities where it is doubtful that even Indians have visited.

On the other hand, there are many regions which have been visited by surveyors and from which no collections have been made. Occasionally reports are brought out from the Interior concerning the wealth and beauty of plants in some outlandish district, but in most instances it was found impossible to bring out specimens on account of the necessity of reducing one's pack to the "last straw." The field, therefore, for botanical exploration is vast.

In this connection it is expected that much valuable work will be accomplished by the staff of the Surveyor-General during the exploration of unknown parts of the country, and advantage is being taken of every opportunity to obtain representative collections from some of those districts.



Fig. 9. *Cornus Nuttallii*



Fig. 10. View of Stony Creek; the "Barrier" in the distance.

At the present time the Botanical Office is not in a position to organize regular botanical expeditions for the exploration of these areas. Transportation of supplies in such a mountainous and heavily timbered country would incur an almost prohibitive expenditure, but occasional opportunities are afforded for carrying on exploration at reasonable cost.

Botanical Exploration of the Garibaldi Mountain Region.

Probably the most important exploration carried on by this office was the botanical work done in the Garibaldi Mountain region in conjunction with the British Columbia Mountaineering Club's summer camp during the years 1912 and 1913.

This region lies between forty and fifty miles north of Vancouver, and up to this time was practically unknown. One or two individual mountaineers or hunters had visited part of this region, but no official information of the district was obtainable from the Provincial or Dominion Government survey maps. Mount Garibaldi, however, which reaches an altitude of 8,700 feet and is a conspicuous landmark from the sea, was included on one of the hydrographical survey charts.

In 1912 the camp was held at a point approximately eight miles due north of Mount Garibaldi in a broad valley at the foot of Black Tusk (7,350 feet). On this occasion the party was composed of eleven members of the British Columbia Mountaineering Club. Food-supplies and botanical equipment were transported from Vancouver to Squamish by boat, thence by pack-horses along twenty miles of Pemberton Trail to Stony Creek. From this the members took part in carrying the provisions up the mountain-side to the camping-ground.

A large collection of plants was made during the two weeks' visit, the flora being distinctly different from that on the mountains in the vicinity of Vancouver. Although most of the spring flowers were past their best and had begun to form fruits, the valleys and lower parts of the mountains were bedecked with a gorgeous array of summer alpine flowers.

The following account is from the Botanical Office report for the month of August, 1913:—

"The most important work of this month was the continuation of the exploration and botanical survey of the mountainous region to the north of Mount Garibaldi. Arrangements were made with the British Columbia Mountaineering Club for my carrying on further botanical investigation during their summer camp. The party numbered about thirty members, nine of whom were students of the previous winter's class in botany. These students were willing assistants and enabled me to obtain specimens from a larger area than could otherwise have been done during the two weeks' camp.

"Leaving Vancouver on Saturday, July 26th, in a large launch, we landed at Squamish and travelled by motor-stage to Brackendale House, where the night was spent. An early start was made the following morning for a day's journey along Pemberton Trail. As most of our baggage and equipment had been sent in by pack-horses, we travelled comparatively light, a camera, vasculum, ice-axe, and a few necessaries in the rucksack constituting our load. After travelling about twenty miles we made a halt for the night at an auxiliary camp about two miles up the north bank of Stony Creek and at an altitude of about 1,400 feet. ([Fig.10](#))

"Early next morning we followed a "blazed" trail up the well-timbered mountain-slopes— following the ridge north of Stony Creek—and in about six hours reached the camp at an altitude of 5,100 feet, in the alp-lands approximately 400 feet above Garibaldi Lake.

"Our first work was the ([Fig.12](#)) preparation of a plot of ground to serve as a temporary botanic garden to which specimens were transplanted from the surrounding peaks and valleys, and afterwards taken out by pack-horses at the end of our visit. This year we left one week

earlier than the previous year, and the vegetation was about two weeks later, so that we found a difference of about three weeks in the phenological conditions. Snow was abundant on the slopes at the time of our arrival, and the predominant flowers were *Claytonia lanceolata*, *Erythronium parviflorum*, *Anemone occidentalis*, *Caltha leptosepala*, and *Trollius albiflorus*. It was interesting to note how these came into flower within a few feet of the receding snow. ([Fig.13](#))

“On Tuesday, 29th, a visit was made to Black Tusk Ridge, returning over the eastern shoulder to *Mimulus* Creek. In the afternoon we climbed the western end of Panorama Ridge and botanized over the upper slopes at an altitude of approximately 6,000 feet. Many specimens were collected and removed to the temporary garden, while others were prepared for the Herbarium.

“On July 30th a whole day was spent in botanizing over Panorama Ridge, approximately 6,000 feet. The principal plants of interest found were *Phlox Douglasii*, *Silene acaulis*, *Phacelia sericea*, *Erigeron compositus*, *Artemisia norvegica* var. *pacifica*, *Juniperus communis*, *Sedum divergens*, *Pentstemon pulchellus*, all of which were abundant on this mountain.

“On July 31st, owing to unfavourable weather, a number of plants were collected from the vicinity of the camp and transplanted to the temporary garden. These included *Pedicularis racemosa*, *P. bracteosa*, *Castilleja miniata*, *Erigeron salsuginosus*, *Senecio triangularis*, *Erythronium parviflorum*, *Claytonia lanceolata*, *Trollius albiflorus*, *Caltha leptosepala*, *Mimulus Lewisii*, *Mimulus alpina*, *Spirea pectinata*, *Anemone occidentalis*, etc.; these plants formed the predominant vegetation at this elevation, 5,000 to 5,500 feet. The herbarium specimens were also gone over and placed between dry sheets of paper.

“On August 1st a whole day trip was made for the purpose of exploring the ridge to the south of Helmet Valley. Commencing at the ([Fig.16](#)) remains of an old crater, we botanized along the edge of Helmet Glacier and found some interesting plants in the vicinity of the black lava-sand on the east side of the crater.

“In the valley below Helmet Peak we found the vegetation much further advanced; the lupines were in flower, and some had pods about half-matured, whereas the flowers in other places were only in bud. It was evident that the sandy soil, free drainage, and favourable exposure were conducive to early flowering. It may be mentioned that the black sand in this locality was at least from 15 to 20 feet deep, the creek flowing from the eastern tongue of the glacier having cut narrow steep-sided channels to that depth. The only plants found actually on the sand were *Epilobium latifolium* and a composite (sp.?), both of which were—as would be expected in such a situation—deep-rooted.

“Farther down the valley the vegetation consisted chiefly of a low growth of *Bryanthus empetriformis*, with *Kalmia glauca-microphylla* and a few scrubby specimens of *Abies amabilis*.

“Continuing in an easterly direction, the southern slopes of Helmet Valley were found to be well covered with scraggy specimens of *Abies amabilis* from 20 to 50 feet in height; the underbrush was mostly *Rhododendron albiflorum*, which, at that time of the year, was in full flower.

“A considerable amount of snow was encountered on the upper parts of Helmet Ridge, at about 6,000 feet. The vegetation was sparse, consisting chiefly of a thin covering of grasses and low carices which had scarcely commenced their season's growth.

“Returning along the bottom of the valley, nothing of importance was noted. The vegetation consisted chiefly of a dense growth of *Bryanthus empetriformis* and *Cassiope Mertensiana*, with occasional grassy patches in which *Lupinus arcticus* ([Fig.17](#)), *Veratrum viride*, *Carduus edulis*, and *Potentilla flabellifolia* were frequent.



Fig. 12. Mountain botanic garden, to which over eighty species were transplanted during the camp.



Fig. 13. Shows *Claytonia lancelata* flowering within a few feet of the receding snow



Fig. 14. *Phlox Douglasii* on Panorama Ridge.



Fig. 15. *Silene acaulis* on Panorama Ridge.



Fig. 16. Remains of an old crater, with lava-sand, pumice-stone, and porous boulders around it. In Helmet Valley, near Helmet Peak



Fig. 17. *Lupinus arcticus* (on Black Tusk slopes)



Fig. 18. *Anemone occidentalis* (fruiting heads)



Fig. 19. *Bryanthus glanduliflorus*



Fig. 20. Castletowers Ridge, where *Loiseleuria procumbens*, *Empetrum nigrum*, and the three species of *Bryanthus* were found associated together.

"At the head of Helmet Valley, near the lower end of Helmet Lake, the vegetation is scant, the ground littered with large porous volcanic boulders, with only occasional patches of volcanic sand, presenting a very desolate scene, so much so that 'Desolation Valley' was first proposed as an appropriate name. Near Helmet Lake, *Aquilegia formosa* and *Ranunculus Eschscholtzii* were prolific.

"August 2nd, another wet day, was spent in attending to herbarium specimens and getting pressers ready for new collections.

"On August 3rd a whole day trip was made over Panorama and Corrie Ridges to Castle-towers Ridge. This was a most successful excursion, several new plants being found in this region. Between Panorama and Corrie Ridges there is a descent of over 1,000 feet, and in the valley was found a considerable amount of *Silene Douglasii* and *Anemone occidentalis*. ([Fig.18](#))

"The north side of Corrie Ridge is steep and the ascent was rather slow on account of the rocks. Although a careful examination was made of many likely crevices and ledges, very few plants were found on the north side; occasional plants of *Bryanthus glanduliflorus* ([Fig.19](#)), *Silene acaulis*, and *Phacelia sericea* were observed, but on the southern slopes near the top (6,200 feet) a number of beautiful specimens of *Antennaria rosea* and some specimens of *Saxifraga nivalis* were found in a few places where the soil had accumulated. These slopes were too steep to grow much vegetation; the continual weathering and falling of rocks from the summit kept disturbing the soil as they rolled down to the base, where they formed a large rock-slide.

"After another descent of over 1,000 feet we crossed the valley and commenced the ascent of Castletowers Ridge, which, being a gradual slope, had many promising localities for exploration. ([Fig.20](#)) One of the first new plants in this area was *Loiseleuria procumbens*, associated with *Bryanthus glanduliflorus* and *B. empetriflorus*, and an intermediate variety believed to be a natural hybrid between the last two species. Within a comparatively small area, not more than 130 feet in diameter at about 5,400 feet, *Gentiana glauca* was abundant. No specimens of this were found in any other part of this region. A little farther on, at about 5,700 feet, beautiful clumps of *Polemonium confertum* (Gray) were found in crevices facing south-west, on the slopes near Sphinx Glacier; specimens of all these species were secured for the garden.

"August 4th was spent in preparing herbarium specimens of the previous days' collections, and in planting those destined for the Botanical Garden. During the evening, Prof. E. H. Burwash, of Chicago University, who conducted a series of geological observations during this visit, gave an interesting lecture on the principal geological features of the district, and illustrated his remarks by reference to specimens he had collected.

"On August 5th a visit was made to the west shoulder of Black Tusk Ridge, where more specimens of *Bryanthus intermedia* were found. It was noted that here, as on Castletowers Ridge, the intermediate form is always associated with the other two species, *B. empetriflorus* and *B. glanduliflorus*. A few specimens were secured for the garden.

"The south-west slopes are fairly well covered with soil which supports a liberal vegetation, *Aquilegia formosa*, *Arnica latifolia* (Bong), *Erigeron salsuginosus*, *Veronica alpina*, *Habenaria leucostachys*, *Lilium columbianum*, and *Lupinus arcticus* (Wats.) being conspicuous, while the "grassy" slopes were found to consist chiefly of clumps of *Luzula* and *Carex*, with comparatively few representatives of the *Graminaceae*.

"On the lower slopes, which are open-wooded (*Abies*), there is an abundance of *Veratrum viride* and occasionally large beds of *Bryanthus empetriflorus*; the *Abies* throughout this

locality appeared to be *Abies amabilis* (Forbes) associated with the mountain-hemlock (*Tsuga Mertensiana*), which closely resembles the former by its purple cones; the cones of the latter are smaller and pendant.

"Towards the top of the ridge the trees are short and scraggy, and some very fine examples are found illustrating the effect of animals—probably mountain goat or sheep—browsing on the young shoots. The basal shoots by repeated branching form an impenetrable thicket several feet in diameter, until the centre is beyond the reach of animals; the central part then grows erect, and is more or less normal.

"On the summit of the ridge vegetation is sparse, and is chiefly composed of a scrubby growth of *Cassiope Mertensiana*, *Bryanthus glanduliflorus*, and some poor specimens of *B. empetriformis* and the intermediate variety. Numerous small creeks, originating in the melting snow, have their banks bedecked with yellow *Mimulus alpinus*, crimson *M. Lewisii*, white *Parnassia fimbriata*, and in gravelly places pink *Epilobium latifolium*; numerous other species added interest to the gorgeous display.

"A party of six, including one member of the botanical section, left in the morning for three days' exploration of the country to the west of Garibaldi Lake, the lake being crossed by means of a raft built the previous day. ([Fig. 21](#))

"The flora was ascertained to be similar to that in the north-east region, with the exception of a few specimens of *Polygonum viviparum* which were found in alp-lands in the vicinity of Table Mountain. This was the only locality where these were found.

"August 6th being a cold and wet day, no field-work was done. The herbarium specimens were gone over and damp sheets dried by the fire at the entrance to our tent.

"On August 7th a trip was made along the northern slopes of Garibaldi Lake and the rocky slopes by the creek which connects it with Lesser Garibaldi Lake. Descending at this point, we came to the dried-up bed of a creek and followed it to Stony Lake, and thence went a short distance down Stony Creek to near "The Barrier." ([Fig. 22](#))

"A few additions to our collection were found during the trip, and some notes made on the vegetation. On the northern slopes near Mimulus Creek a few specimens of *Lonicera utahensis* were found in flower. This plant may be abundant, but on account of its close resemblance in size and habit to *Rhododendron albiflorum* it is liable to be overlooked, especially as they grow side by side in the same habitat.

"The rhododendron was very floriferous on a broad sloping ledge 200 to 300 feet above Garibaldi Lake. It was well sheltered from the north and fully exposed to the south; there were occasional plants of *Lilium columbianum* and abundance of *Castilleja miniata* in the same locality. On the slopes of the creek leading to Lesser Garibaldi Lake, with a western exposure, the yellow cedar (*Chamaecyparis nutkaensis*) was very common. Along the banks of Lesser Garibaldi Lake and Stony Lake specimens of *Polygonum minimum* and a showy large-flowered aster, also a small spreading yellow-flowered crucifer (evidently a *Roripa*), were found, and specimens secured for the Botanical Garden.

"The return journey was made through the open woodlands along the edge of the alpine plateau at an approximate altitude of 5,000 feet. On the way up several patches of *Pedicularis racemosa* were found, associated with abundance of *Veratrum viride*.

"On August 8th preparations were commenced for our departure, and arrangements made for having the garden specimens lifted and packed into boxes to be transported about thirty miles by pack-horses, and thence by boat to Vancouver. Supplies were obtained of about eighty species of alpine plants, which have since been safely established at Essondale. The bundles of herbarium specimens were roped up and covered by water-proof sheet to protect them in case of wet weather during the journey out.



Fig. 21. The raft crossing to the south-west of Garibaldi Lake, about three and a half miles. Loaded with tent and provisions for six men for three days.



Fig. 22. View of "The Barrier" from near Stony Lake

"On the evening of this date (8th) I gave a camp lecture, summarizing the botanical features of the district. The lecture was illustrated by herbarium and "garden" specimens. The principal characteristics were: The flora of that region was composed of perennial plants, which had probably been storing food underground for a few years before they first produced flowers. The shortness of the growing season—a few weeks—from the disappearance of the snow till the return of the winter coat, was against the chances of annuals successfully establishing themselves.

"Plants producing edible fruits were rare, *Juniperus*, *Empetrum*, *Vaccinium*, and *Lonicera* being the only representatives of this class found, which represented those plants dependent on birds as the agency for seed-dispersal. We found that birds were comparatively rare in this locality, the mountain-grouse and ptarmigan being the chief representatives.

"The plants which were most common either produced very small and light seeds or were furnished by a pappus or other means for wind distribution. Examples of the former: *Cassiope*, *Bryanthus*, *Habenaria*, *Castilleia*, *Kalmia*, *Mimulus*, *Rhododendron*, *Pedicularis*, *Spiraea*; and of the latter: *Erigeron*, *Artemisia*, *Petasites*, *Anemone*, *Arnica*, *Gnaphalium*, *Salix*, *Abies*.

"Plants in exposed places had, on the whole, some xerophytic adaptations ; most were low and deep-rooted—*Phacelia sericea*, *Silene acaulis*, *Polemonium confertum*, *Empetrum nigrum*, *Loiseleuria procumbens* : some had tomentose foliage—*Phacelia* and *Gnaphalium*; but most had the leaf surface reduced—*Lycopodium*, *Silene acaulis*, *Cassiope*, *Saxifraga bronchialis*, *Abies*; or revolute—*Juniperus*, *Bryanthus*, *Loiseleuria*, *Kalmia*, *Empetrum*; and a few had fleshy leaves for storing water—*Sedum divergens*, *Saxifraga Tolmieae*. Plants with larger leaves were practically confined to more sheltered habitats—*Castilleia*, *Lupinus*, *Erythronium*, *Veratrum*, *Mimulus*, *Habenaria*, *Aquilegia*, etc.

"A splendid illustration of this was shown in a locality where *Veratrum viride* was very abundant in the open woodland near the top of the slopes. On the more exposed plateau poorly developed plants were found, with their leaves split and torn by lashing in the wind. Attention was also directed to the fact that, on the so-called "grassy" slopes, sedges and rushes were more abundant than grasses.

"Another noticeable feature was that on a large area about one and a half miles long by three-quarters of a mile wide, where *Cassiope* formed the predominant vegetation, interrupted only by frequent clumps of *Abies amabilis*, *Bryanthus empetrifolius* was always found forming a ring close around each clump, evidently obtaining the drip from the drooping branches, and suggesting that it did not withstand drought so well as the *Cassiope*. Of course, there were other areas where *Bryanthus* practically crushed out the *Cassiope*.

"On August 9th we left camp at 7 a.m., and after a long hot journey on foot arrived at Cheakamus House at 6 p.m., returning to Vancouver on August 10th by boat from Squamish."

Owing to pressure of Department work and in attending to the numerous collections sent in by correspondents, the material collected during this exploration trip has not yet been worked up, but a list of all the specimens found in this interesting district will be issued later on.

Savary Island.

On July 2nd, 1911, an opportunity was afforded for visiting Savary Island, by joining a party on a survey trip. This island lies 82½ miles north-west of Vancouver, and is approximately four and a half miles long, with an average width of half a mile. The shore-line is sandy except at the eastern end, where it is rocky. Again on May 24th, 1912, I revisited the island and was accompanied by several members of the previous winter's botany class.

The collections obtained on both these occasions were large, and gave a very good idea of the richness of the flora. The flora on the south shore is characteristically one adapted to; xerophytic conditions. At some points there are sand-dunes on which *Carex macrocephala*; ([Fig.24](#)) acts as a sand-binder. On the sand-dunes were also found specimens of *Convolvulus soldanella*. In other places *Elymus*, apparently *E. mollis* (Trin), is very abundant. This is particularly so along the northern shores, where it forms an association with *Arenaria ? peplioides* var. *major* and *Lathyrus maritimus*, ([Fig.25](#)).

Between this association and the higher ground of the island there is a flat sandy area covered more or less with grass, amongst which the following are abundant: *Fritillaria lanceolata*, *Brodiaea grandiflora*, *B. lactea*, *Allium cernuum*, *Allium acuminatum*, *Lilium columbianum*, *Smilacina racemosa*, *Aquilegia formosa*, *Anemone multifida*, *Achlys triphylla*, *Aphyllon uniflorum* (on roots of *Heuchera*), *Aphyllon fasciculatum* (on roots of *Artemisia*), *Boschniakia strobilacea*(on roots of salal), *Arceuthobium* sp. ? (on branches of *Pinus contorta*)

Amongst other plants of interest found were the following: *Arbutus menziesii*, *Berberis nervosa*, *Berberis aquifolium*, *Campanula rotundifolia*, *Castilleja bradburii*, *Disporum oregonum*, *Eriophyllum caespitosum*, *Grindelia integrifolia* var. ?, *Lonicera cilosa*, *Lupinus littoralis*, *Pryola rotundifolia* var. *bracteata*, *Sanicula Menziesii*, *Symporicarpos racemosa*, *Taxus brevifolia*, *Vaccinium ovatum*.

At many points on the north-west shore there are large areas of submerged sand covered with *Zostera marina*, portions of which become detached and are cast up along the rocky coast of the Mainland. In the deeper water *Nereocystis Luetkeana* is abundant. ([Fig.26](#)) (It may be mentioned that this curious brown Algae is also found in abundance in Burrard Inlet a few miles east of Vancouver.) Specimens of *Ulva*, *Polysiphonia*, and other well-known Algae were found washed up on the sands.

Botanical Exploration of the Black Mountains Region.

Black Mountain, at the western end of the Grouse Mountain series, reaches an altitude of 4,250 feet. Owing to the dense bush which covers the foot-hills and to the numerous ridges and valleys which have to be crossed before reaching it, this is one of the least-visited mountains in this district. Practically no information regarding the flora could be obtained from any of those who had visited this district, so it was decided that a visit should be made for the purpose of collecting specimens and ascertaining the nature of the country between North Vancouver and the northern slopes of Black Mountain.

With the assistance of Messrs. F. Perry and W. Taylor, two members of the Mountaineering Club's botany class—and expert mountaineers—who volunteered to act as guides and assist by carrying in provisions and carrying out specimens, I was enabled to make the most of my visit to this little-known area.

On the morning of July 11th, 1912, we left via North Vancouver; crossing the Capilano Canyon, we held north-west for several miles through the bush and over ridges or mountains which are practically wooded to the top. On the first night we camped near the summit of Hollyburn Ridge at an altitude of approximately 3,000 feet.

Up to this time it was considered that Hollyburn Ridge was part of Black Mountain, but it was ascertained during this visit that Hollyburn Ridge is separated from Black Mountain by a deep steep-sided valley, at the bottom of which flows Cypress Creek. The creek was followed to its headwaters, and during the journey several precipitous places had to be negotiated; there being occasional waterfalls. ([Fig.27](#)) At the headwaters of Cypress Creek it was found there was a stretch of several acres of more or less marshy moorland which, when covered

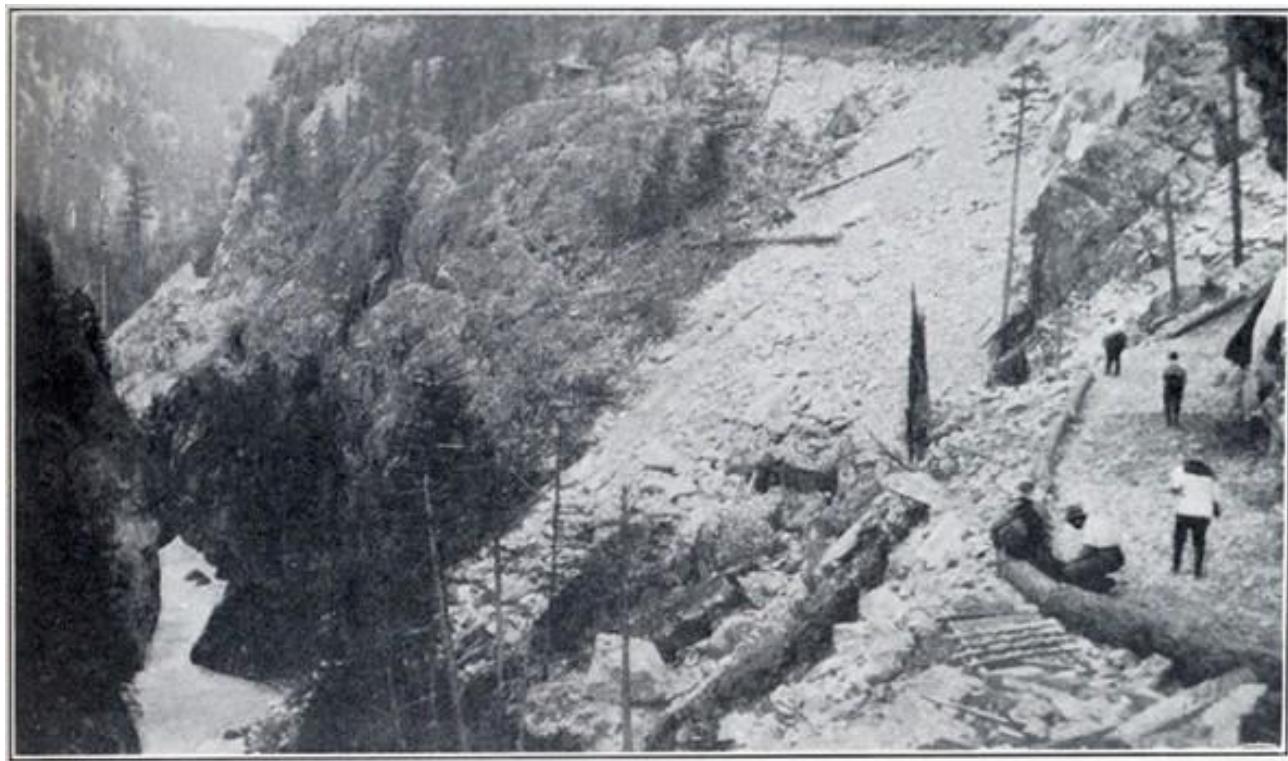


Fig. 23. Cheakamus Canyon



Fig. 24. *Carex macrocephala*



Fig. 25. Sandy shore "plant association."

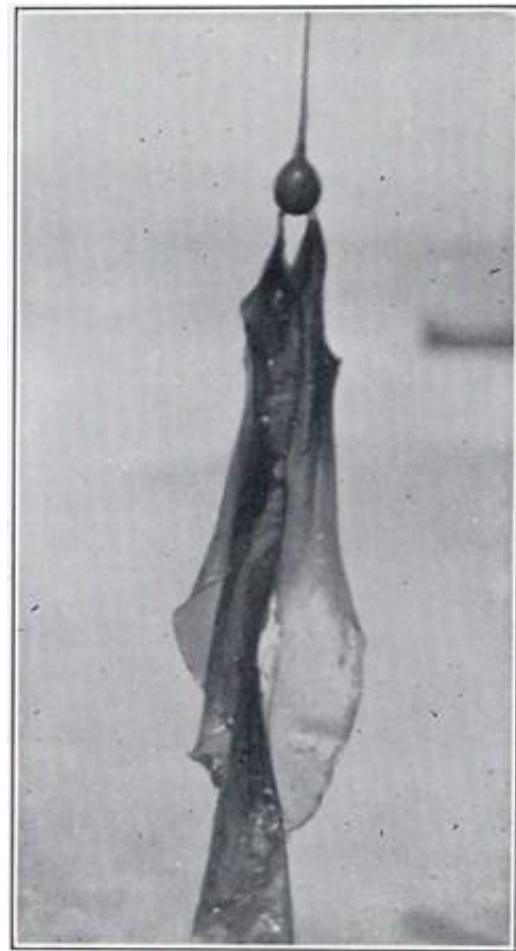


Fig. 26. *Nereocystis luctkeana*



Fig. 27. On Cypress Creek



Fig. 28. Corner of lake on Hollyburn Ridge

with snow in winter, had given origin to the idea that Cypress Creek originated from a lake. The ascent of Black Mountain was made from the north-east slopes, the summit being reached towards evening, when we again camped.

On the following morning several hours was spent in collecting from the various peaks and around the small lakes on the top, and although there are many interesting localities over the large comparatively flat top, nothing of special importance was found. The descent was made by the south-west slopes to Eagle Lake. These slopes are comparatively bare, having been devastated by fire several years ago. Isolated ledges and gullies, with accumulations of soil, afforded a foothold for representatives of the former flora.

We returned from Eagle Lake over the foot-hills, and finally landed in a cedar swamp, from which we found our way out about 8 p.m. We camped near Caulfields, and on the following morning botanized along the Coast from Caulfields to Hollyburn, returning by ferry to Vancouver.

Apart altogether from the large general collection made during those four days, the amount of information obtained regarding the flora of the neighbourhood, and the relative abundance of the various species, was sufficient to stamp the excursion as a successful one.

Amongst the most interesting plants found were: *Menyanthes cristagalli* (*Nephrophyllidium crista-galli*), which is abundant on the summit of Hollyburn Ridge, and is also found on the marshy slopes of Black Mountain near Cypress Creek. *Coptis asplenifolia* is abundant on Hollyburn Ridge. The white *Rhododendron albiflorum* is prolific and is associated with beautiful shrub, *Chladothamnus pyrolaeflorus*, which has flowers of a reddish-bronze colour. In the small lakes ([Fig.28](#)), which are common in that region, *Nuphar polysepalam* is abundant and flowers profusely. In marshy situations by Cypress Creek one or two patches of *Pinguicula vulgaris* were found; this plant is comparatively rare in this district. On the steep rocky slopes of the foot-hills near Black Mountain one or two plants of *Actostaphylos tomentosa* were found, and there was abundance of *Boschniakia strobilacea* between Black Mountain and Caulfields.

Near the summit of Black Mountain there is an abundance of *Penstemon Menziesii*. On the southern slopes were found plentiful supplies of the yellow tiger-lily (*Lilium columbianum*) and also of *Clintonia uniflora*. In the more moist situations between the foot of Black Mountain and Eagle Lake the maidenhair fern (*Adiantum pedatum*) is common. *Pyrola secunda*, *P. picta*, *P. rotundifolia* var. *bracteata*, *Chimaphila menziesii*, *C. umbellata*, *Aquilegia formosa* were all common on the foot-hills of Black Mountain between Eagle Lake and Eagle Harbour.

On the eastern slopes of Hollyburn Ridge were found *Moneses uniflora*, *Monotropa uniflora* (Indian pipe), *Hypopitys multiflora*, and an abundance of *Corallorrhiza mertensiana*, showing considerable variation in colour from red to almost white. Other orchids common in this locality were *Goodyera Menziesii*, *Habenaria gracilis*, *Listera cordata*, and *Listera caurina*. The *Listeras* are very abundant at an altitude of approximately 2,000 feet, growing together in the same habitat. The form of the leaf and the size of the flower, as well as the more robust habit, easily distinguish *L. cordata* from *L. caurina*.

On the journey along the Coast from Caulfields to Hollyburn one or two interesting specimens were found. In one or two situations which at times are submerged by the sea at high tide were found an abundance of *Glaux maritima* and *Crantzia lineata*, a peculiar umbelliferous plant with the leaves reduced to hollow cylindrical petioles.

The flora of the Caulfields District is particularly interesting on account of its geological formation, its exposure to the south, and its protection from the north. The flora is very

different from that to the south of English Bay. Rock is the predominant foundation for numerous small flowering plants. This is most marked where the cliffs near Howe Sound rise to a height of from 80 to 150 feet. On the top of these rocks may be found a thick covering composed of mosses and *Selaginella rupestris*. Here and there on this covering are found patches of *Collinsia parviflora*, *Valerianella congesta*, *Claytonia parviflora*, and *Mimulus alsinoides*. In the depressions and vertical crevices of the rocks numerous specimens of Madrone, (*Arbutus Menziesii*) are found, many of which develop into good-sized trees, but owing to the rocky substratum and the long distance to which the roots have travelled, it is practically impossible to transplant specimens from this habitat.

On some of the old rock ledges where moisture can accumulate, large masses of soil, composed chiefly of decaying vegetation, are found. On such a substratum one finds various mosses and moss-like liverworts such as *Frullania* or *Porella*, and occasionally small patches of *Erythronium grandiflorum* var. *albiflorum*.

The dogwood (*Cornus Nuttallii*) is very common in the woods in this vicinity. *Physocarpus* (*Nellia*) *opulifolius*, *Ribes sanguineum*, *Pachystima myrsinites*, *Micromeria douglasii* and *Brodiaea grandiflora* are also common in this locality; the latter is rather local.

In the crevices of bare rock near the sea may be found dwarf specimens of *Amelanchier alnifolia*, which in such a situation becomes almost prostrate in habit, and is a very different-looking plant from that found farther south along the Coast near White Rock. ([Fig. 29](#)) *Alium cernuum* a species of *Grindelia*, probably a dwarf form of (*G. oregana* Gray), is also common in some situations on these bare rocks. *Calypso bulbosa* is occasionally found on the foot-hills of Black Mountain, but is comparatively rare in this locality. It may here be mentioned that specimens of this plant are frequently found in Point Grey. It is quite common in the vicinity of Crescent and on Vancouver Island.

The Dry Belt Flora.

During the summer of 1915 a trip was made through the Dry Belt region as far as Penticton, over -170 miles from Vancouver. Some days were spent collecting in the neighbourhood of Spences Bridge, about 170 miles east of Vancouver. Notes were made of the characteristic plants in this locality, where it was found that the predominant vegetation consists of sage-brush (*Artemisia tridentata*, *Artemisia rigida*) and *Bigelowia dracunculoides*. Along the banks of the Thompson River are found specimens of *Salix longifolia* var. *argyrophylla* (sandbar willow), *Juniperus scopulorum*, *Clematis ligusticifolia*, *Asclepias speciosa*, *Euphorbia glyptosperma*, *Mentzelia laevicaulis*, and several other characteristic Dry Belt species. In the drier parts of the valley there is an abundance of *Opuntia polyacantha* and occasional bushes of *Ribes cereum*. On the benches which rise on both sides of the valley to a height of 300 feet or more, the vegetation consists of an open growth of *Pinus ponderosa*, amongst which are found frequent clumps of *Balsamorrhiza sagittata* and *Calochortus macrocarpus*.

Proceeding to Kamloops, seventy-two miles east of Spences Bridge, a further collection of specimens was made in this locality. The most notable observation made in Kamloops was the abundance of introduced plants which form the characteristic weeds of a Dry Belt town. All along the railway, roadsides, vacant lots, and waste places around the town, such weeds as Russian thistle (*Salsola kali tenuifolia*), tumbling mustard (*Sisymbrium altissimum*), burdock (*Arctium lappa*), pigweed (*Amaranthus retroflexus*), tumbleweed (*Amaranthus graecizans*), the great mullein (*Verbascum thapsus*), sow-thistle (*Sonchus arvensis*), orache (*Atriplex patula*), goosefoot (*Chenopodium album*), shepherd's-purse (*Capsella bursa-pastoris*), etc., were prolific. Kamloops during that year must have been a very fruitful centre for the distribution of detestable weeds—a railway town, and its proximity to the Thompson River, being important factors to aid in this distribution.



Fig. 29 *Amelanchier alnifolia*



Fig. 30. *Euphorbia glyptosperma* spreading over the hot pebbles near Thompson River

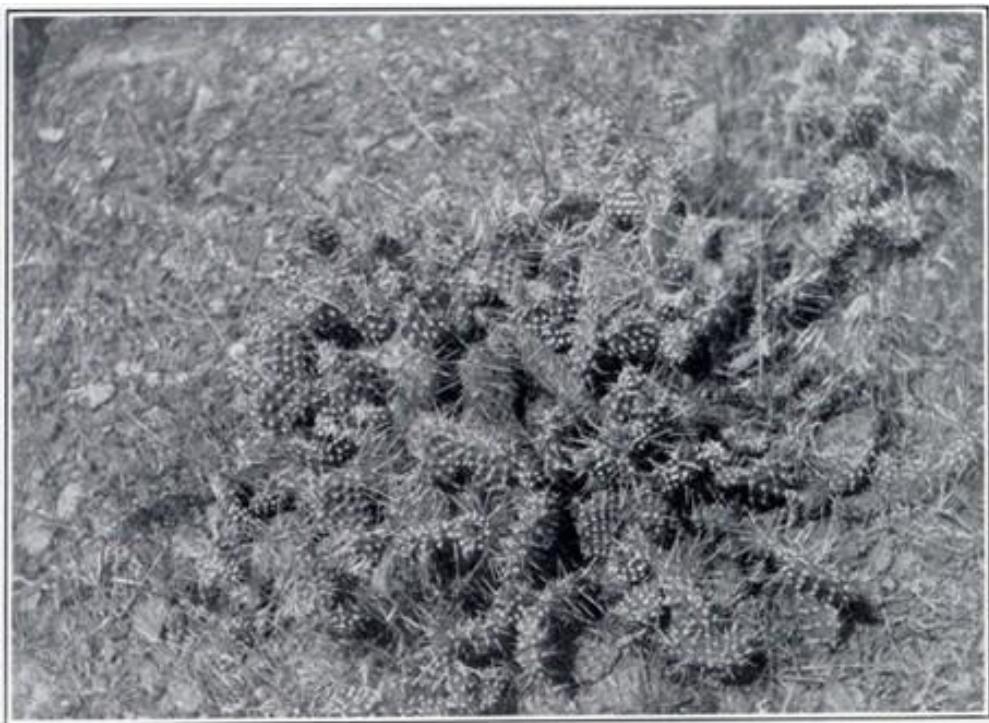


Fig. 31. *Opuntia polyacantha*



Fig. 32. Clumps of *Asclepias speciosa* near Spences Bridge



Fig. 33. Single head of milkweed (*Asclepias speciosa*)



Fig. 34. Characteristic sage-brush country. The trees are the yellow-pine

On my way to the Okanagan Valley a short stay was made at Sicamous. Between Kamloops and this point there is a gradual transition from the Dry Belt flora to that adapted for more moist conditions. In the vicinity of Sicamous, cactus, sage-brush, and *Asclepias* practically disappear, and much more luxuriant vegetation takes their place. *Apocynum cannabinum* and *Apocynum, androsaemifolium* and a number of asters were found common here. By the edge of the forests, which were composed chiefly of *Picea Engelmanni*, a few shrubs of *Ceanothus* were observed in flower.

In the Okanagan Valley, from Sicamous to Okanagan Landing, a distance of over fifty miles, the country is devoted largely to farming; but here and there one finds areas more or less in their natural condition and containing many interesting semi-Dry-Belt specimens. At Armstrong Mr. Eli Wilson, B.A., showed me a number of the most interesting botanical districts in that vicinity; amongst the plants found were *Disporum trachycarpum*, *Monarda fistulosa*, *Lupinus argenteus*, *Sambucus glauca*, *Berberis aquifolium*, a few *Loniceras*, *Clematis*, etc.

The next collecting-ground was in the vicinity of Penticton (at the south end of Okanagan Lake), over 150 miles south of Armstrong. During this journey one enters the Dry Belt vegetation soon after leaving Okanagan Landing (at the northern end of Okanagan Lake), the characteristic sage-brush and yellow pine taking the place of the more luxuriant vegetation in the northern part of the Okanagan Valley. All along Okanagan Lake, particularly on the east shore, may be seen numerous small orchards, with an occasional large one.

At Kelowna there is a large stretch of flat country where it is expected the flora must differ from that in the surrounding district, and again near Gellatly one finds another piece of country which should prove of particular botanical interest, as the environment at those two points differs from that in other districts in the Okanagan.

At Penticton some time was spent in collecting specimens to illustrate the characteristic flora of this district. Here were found abundance of the cactus (*Opuntia*), sage-brush (*Artemisia*), sumach (*Rhus glabra*), *Clematis ligusticifolia*, *Eriogonum heracleoides*, *Gilia aggregate*, *Utricularia vulgaris*, *Verbascum thapsus*.

Plants found in other parts of the Okanagan Valley were *Botrychium virginianum*, *Spiraea lucida*, *Prunus virginiana*, *Sanicula Menziesii*, *Blitnum capitatum*, *Corylus rostrata*, *Larix occidentalis*, etc.

This trip to the Dry Belt was taken chiefly for the purpose of making a general botanical survey of the country traversed, and for the purpose of deciding which particular areas should be represented by Botanical Office correspondents. Since then we have added a number of correspondents for this district.

(14.) The collection of material for research-work.

The chaotic condition of North-western botany has already been alluded to. This condition has been largely brought about by Western botanists, who, it seems, endeavor to describe every variation as a separate species. Many of our Western species are based on very artificial characters, and have often been described and named from insufficient material, and with little information regarding the specimens. Later botanists, with a fuller knowledge of the species, have followed up such descriptions, and in some cases have considered it necessary to change the names previously given. There are many Western species which we have good reason to believe are based on forms characteristic of particular environments, and evidently most of these new species are described from herbarium material and the few notes accompanying them, and not from a practical knowledge of the specimens in the field.

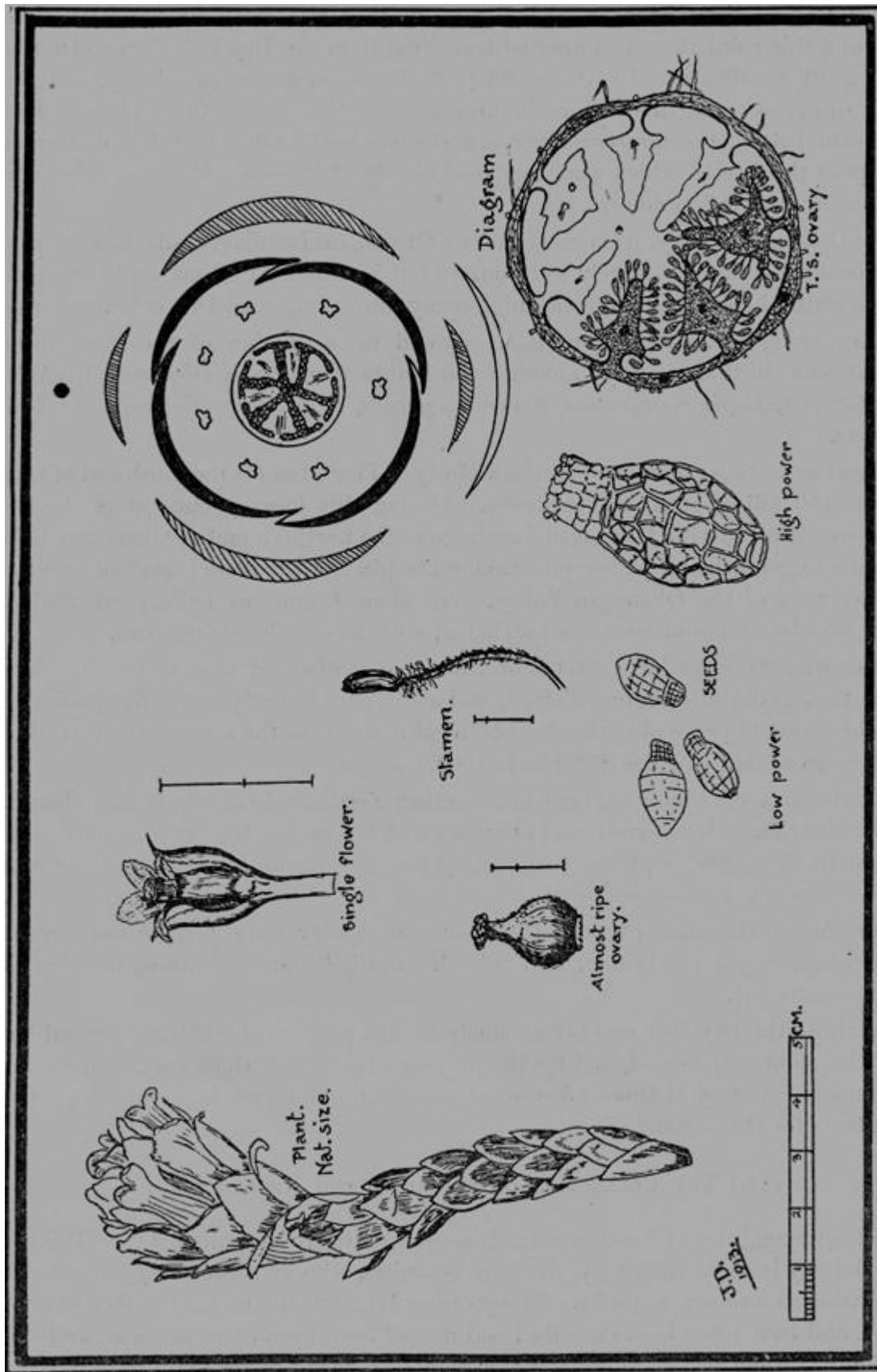


Fig. 36. A connecting link between *Newberrya* and *Pleuricospora*.

One instance of this may be mentioned. Near Vancouver we have a parasitic or saprophytic plant, which, on the whole, corresponds with the description of *Newberrya congesta*, Torr. Our specimens were first believed to be *Pleuricospora fimbriata*, and (when full and accurate details regarding the ovary of *Newberrya* are available) they may yet prove to belong to this genus.



Fig. 35. Showing how large the sage-brush (*Artemesia tridentata*) sometimes grows



Fig. 37. Showing four variations of *Opuntia polyacantha*

The essential differences between the two, as given in the "Floras," are:—

Newberrya.

Calyx.—Incomplete, composed of 2
bract-like sepals.

Corolla.—Tubular-urceolate

Pistil.— With 4 placentae each bi-lamellate.

Pleuricospora.

Complete, composed of 4-5 scale-like sepals.

Petals resembling the sepals.
4 or 5 parietal placentae.

Whether our specimens be Newberrya or Pleuricospora, one at least of the generic distinctions must be cancelled. It will be seen in the following table of variation that plant 1 has all its flowers with the characteristic calyx of Newberrya; while in plants 2 and 3 we find considerable variation in the flowers of the same plant, some having the two bract-like sepals, others having either one or two smaller scale-like sepals in addition, thus corresponding in number to those of Pleuricospora.

Considering that the calyx was too variable to be of much value as a generic character, I turned my attention to the structure of the ovary, and, through the kindness of Dr. C. F. Newcombe, of Victoria, obtained a copy of the original description of *Hemitomes congestum*, together with a photo and tracing of the illustration accompanying the description. In this I found that the structure of the ovary was largely conjecture, that Dr. Gray had not sufficient material to ascertain its structure, as he mentions that it is founded on a fragmentary specimen, and he hopes that further specimens may come to hand to confirm or correct his analysis. He, however, expressed no doubt regarding the structure of the anthers, and, from their being apparently one-celled, based the name *Hemitomes* on this.

At a later date Dr. Torrey obtained good specimens of this plant and ascertained that the anthers were not one-celled as Dr. Gray described them, but that they were distinctly two-celled, hence *Hemitomes* was quite inapplicable, and Dr. Torrey changes the name to *Newberrya* in honour of the first discoverer of the plant.

Several species of this genus, all of them Western, have been described, and some have evidently been described from fragmentary specimens; one species, I believe, had never been found before, and has not been found since.

It seemed most natural, then, that information regarding the structure of the ovary should next be sought from the descriptions of other species of *Newberrya*, and finding that Prof. E. L. Greene, of the Smithsonian Institution, had described one under the name *Hemitomes pumilum*, I communicated with him requesting a copy of the original description of this, and also of *N. subterranea*, described by Miss Alice Eastwood, of the California Academy of Sciences. Professor Greene kindly acceded to this request; and in a recent visit of Miss Eastwood to this office, further information was obtained regarding her specimens.

A point which should be noted is that Dr. Gray, in his description, referred to the apparently unusual character of the ovary, but he stated clearly that he had so little material to work on that he was not certain as to the structure. It seems strange, therefore, that in the descriptions of subsequent species there is practically no information regarding the structure of the ovary; none of them indicate whether it agrees with, or differs from, the original description of *Hemitomes congestum*; so that the true structure of the ovary of *Newberrya* still remains to be definitely ascertained.

The plant in our neighbourhood has a very different habit from the illustration accompanying Dr. Gray's description, the number of stamens has little or no relationship to the number of petals; but the illustration of the flower is almost identical with ours, and the description of the plant agrees fairly well with our specimens. ([Fig. 36](#))

The structure of the ovary in our specimens somewhat resembles that found in Papaveraceae, being unilocular, with a variable number of carpels having superficial placentation.

A considerable amount of variation was found in the number of parts in some of the whorls. The following table shows the results found in eighteen flowers taken from three plants:—

Plant.	Flower.	Bracts.	Lat.	Sepals.		Petals.	Stamens.	Placentae.
				Ant.	Post.			
One	One	1	2			4	8	8
	Two	1	2			4	6	6
	Three	1	2			4	7	7
	Four	1	2			4	5	6
	Five	1	2			4	6	9
	Six	1	2			4	6	7
Two	One	1	2	1	1	4	7	7
	Two	1	2	1		4	8	8
	Three	1	2	1	1	4	8	8
	Four	1	2	1	1	4	8	8
	Five	1	2	1	1	4	6	7
	Six	1	2			4	8	8
Three	One	1	2			4	7	7
	Two	1	2			4	7	7
	Three	1	2		1	4	8	8
	Four	1	2			4	6+(2)	7
	Five	1	2	1	1	4	8	8
	Six	1	2			4	7	7

From the above it will be noticed: (1) That the number of stamens seems to have some relation to the number of carpels; (2) that there is considerable variation in flowers of the same plant; and (3) that some plants are more constant than others. In addition to this, there is also considerable variation in the size of the specimens, ranging from 2-12 cm. in height.

Our specimens are found on mountain-slopes at an altitude of from 1,000 to 2,000 feet in shady woods composed of fir and hemlock, and in association with *Monotropa uniflora*. The exposure is south by south-east.

Abundant opportunities and material were available for the study of the specimens found here, and if those species, other than *M. congesta*, are to be regarded as valid, there are sufficient differences to warrant the description of our local plant as a new species. But it is often easier to see differences than resemblances, and I am of the opinion that much more valuable work is done by those botanists who devote most attention to tracing existing relationships between apparently different species than is done by those who magnify differences seen in immature or abnormal specimens.

No one with a knowledge of the relation of plants to environment would hesitate to say that our plant, if grown in a slightly warmer atmosphere, would elongate, becoming more lax and the scales more fully expanded, so that the habit would ultimately approach that shown in Dr. Gray's illustration. Similarly, if grown in drier or more open environment, the plant becomes dwarf and congested, approaching *M. pumila* (Greene). If dug up before it appears through the ground, it approaches *M. subterranea* (Eastwood), which, it is stated, is remarkable on account of its flowering 3 inches beneath the surface of the ground. In this connection it may be mentioned that our specimens, like most other Monotropeae, have their flowers formed before they appear through the ground.

The question suggests itself: Is it possible that the plants which Dr. Gray described under *Pleuricospora* may have been fully developed specimens of the one described by him thirteen years before under the name *Newberrya*, and that the other species may only be different stages or forms of this very variable plant?

This subject of variation within the limits of a single species is one which has attracted my attention for many years, and ever since my coming to British Columbia I have been struck with the abundant opportunities afforded for research in this direction. My observations have led me to view with suspicion many of our so-called species, especially those based on such transient characters as habit, pubescence, form of leaf, and other points related to environment.

In order to study this subject systematically, collections of herbarium and garden specimens are being made, so that the validity of many of these "species" may be substantiated or refuted.

Commencing with individual specimens, it is proposed to grow them in our Botanical Garden, and secure seeds, from which plants will be grown for supplies to study the range of variation in the offspring, and so ascertain if the selected points of difference are permanent characters. Some species of *Carex*, *Salix*, *Viola*, *Lupinus*, *Aster*, *Arnica*, *Gaillardia*, *Penstemon*, etc., are genera which require systematic study.

While collecting in the Dry Belt during the summer of 1913 a. number of different forms of, evidently, *Opuntia polyacantha* were found. In the illustration four of these are shown.

It seems that the type *O. polyacantha* and a variety *borealis* have been recorded for this district. Careful observations of these forms were made in the field, and there were found transition forms leading gradually from the typical flat-jointed forms to the almost spherical-jointed ones. Some curious elongated finger-like forms were believed to be young plants, but in other places some small, apparently young, specimens were found which did not develop into similar cylindrical joints. Supplies of the different forms—about eight altogether—were sent to the Botanical Garden to be cultivated and afterwards compared with each other in all their stages.

In addition to those cacti from the Dry Belt, another collection from Bare Island was received from one of our correspondents. Bare Island, near Vancouver Island, is separated from the Dry Belt by a wide stretch of moist coast country, and in a few situations in this neighbourhood *Opuntia* thrives vigorously on exposed rocky habitats. The material collected from both these areas will enable a comparative study to be made of these various forms, and ascertain whether they are forms in transition or whether the intermediate forms may be hybrids.

(15.) Publications.

Annual Reports.

It is proposed to issue annual reports giving a summary of the work done in the various departments of the Botanical Office during the previous year.

The progress of the Botanical Garden, Herbarium, and botanical survey work will be accompanied by a brief account of research carried on in the office.

Bulletins.

It is proposed to issue bulletins from time to time giving contributions to our knowledge of the flora of British Columbia. These will contain detailed accounts of investigations made relating to particular native genera, to ecological or phytogeographical studies, and to histological research carried on in the laboratory.

Leaflets.

With a view to assisting and encouraging nature-study in schools throughout the Province, it is proposed to issue from time to time leaflets dealing with particular subjects or features of plant-life in the Province. The information given in these will be of a more or less popular nature, differing from the bulletins, which must necessarily be more or less technical.

In the leaflets it is proposed that such subjects as the following will be taken up:—

- (1.) School gardens for the supply of specimens for nature-study.
- (2.) The preparation of school herbaria.
- (3.) A series of lessons on our native plants. Part 1: Dry Belt plants. Part 2: Alpine plants. Part 3: Bog-plants. Part 4: Pollination. Part 5: Methods of seed-dispersal, etc.

In these, special attention will be given to the native flora on account of the fact that it differs so markedly from that east of the Rockies.

Conclusion.

Before closing this, the first, report of the Botanical Office, I wish to thank those botanists in various parts of the world who have rendered, or kindly offered, assistance in our work. It is gratifying to feel that the interest in the flora of this comparatively new field is not a purely local one, and we welcome the interest shown by botanists in various parts of Canada, Europe, and America, who have; expressed the desire to obtain British Columbia specimens by exchange of herbarium specimens or seeds.

Special thanks are due to Prof. J. W. H. Trail, of the University of Aberdeen, for placing at our disposal his knowledge of botanical survey methods ; to Sir David Prain, of the Royal Botanic Gardens, Kew (Eng.), for assistance in special cases of nomenclature ; to Dr. B. Daydon Jackson, of the Linnean Society of London, for information relating to early botanical explorers in North-west America ; to Prof. E. L. Greene, Washington ; Mr. A. A. Heller, California; Miss Alice Eastwood, California; Dr. A. J. Grout, New York: Mr. Jas. M. Macoun, Ottawa ; and others, who have in various ways helped our work by supplying specimens for comparison or information regarding critical species.

Respectfully submitted.

JOHN DAVIDSON,

Provincial Botanist.

VICTORIA. B.C.

Printed by William H. Cullen, Printer to the King's Most Excellent Majesty.

1914

**SKETCH
MAP**
*of a portion of
the*
GARIBALDI GROUP

of mountains in the vicinity of

GARIBALDI LAKE

British Columbia

Prepared for the

B.C. Mountaineering Club.

Scale of Miles.
0 1 2

W. J. Gray.
1912.

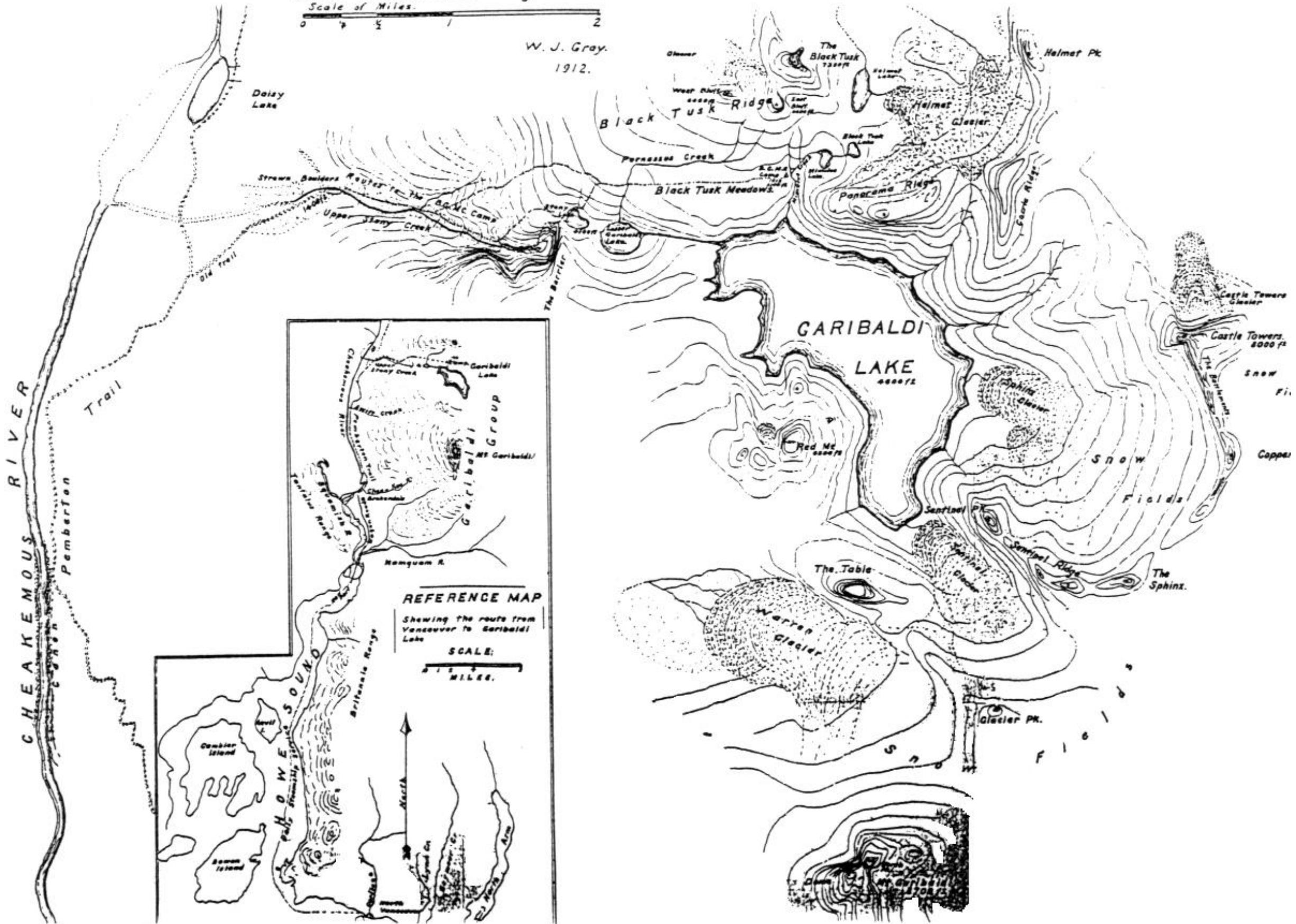


Figure 11. B.C.M.C map of Garibaldi region